ENGINEERING REPORT

I-84 Wallkill Rest Area Water System Replacement
PWS ID# NY3517028

New York State Office of General Services
New York State Department of Transportation

Date Prepared:
November 2020

Prepared by:
CHA Consulting, Inc.
3 Winners Circle
Albany, NY 12205

Introduction

The existing buried hydropneumatic tank at the I-84 Wallkill Rest Area (west bound) has failed, causing a water outage. Temporary toilets have been provided since the outage began. Since buried hydropneumatic tanks no longer meet *Recommended Standards for Water Works*, the existing tank cannot be replaced in kind. As such, the water system will be modified to include an above-ground tank to provide flow equalization and chlorine contact time for the ground water. This letter report summarizes the engineering basis of design for the improvement project.

Background

The Wallkill Rest Area is a bathrooms-only facility serving the westbound lanes of I-84, between exits 28 and 19B (old exits 5 and 4). The facility includes toilets and sinks for men and women, as well as drinking fountains and hose bibs. The peak flow rate, using the water supply fixture unit method in the Plumbing Code, is 75 gpm. Average water usage depends on the number of travelers using the facility; existing water meter records are not available for this site.

The existing water system for the facility is supplied by two groundwater wells of unknown depth or capacity. Records indicate the existing well pumps are 1.5 HP each. A flow rate of 25 gpm is estimated for each well using the hydraulic HP relation $HP = \frac{Q*H*SG}{3960}$, assuming a pump efficiency of 80%, a depth to water table of 50 feet, and a historical working pressure of 60 psi.

The wells formerly discharged into a 15,000 gallon, 10-foot diameter buried hydropneumatic tank. An air compressor recharged the pressure in the tank as the air saturated into the water, and the wells were cycled based on the level of water in the tank. Sodium hypochlorite is used for disinfection and was dosed into the hydropneumatic tank. The existing chlorine system was non-functional and will be replaced.

Proposed System

The existing tank has been removed and disposed of, and the well discharge mains will be re-routed to connect to a new above-ground 2,000 gallon polyethylene storage tank. The chlorine pump discharge line will also be re-routed to the tank. The tank will provide 8 minutes of chlorine contact time, which satisfies the requirements for 4-log virus inactivation assuming a worst-case winter groundwater condition of 5°C (40°F), a peak demand of 75 gpm, a chlorine concentration of 1.0 mg/L, and a baffling factor of 0.3. A new sodium hypochlorite feed pump (with associated backpressure and pressure relief valves) and tank will be provided to maintain a 1.0 mg/L residual at peak demand.

The existing well pump control panel is antiquated and will be removed as part of this project. A new well pump control panel will be installed, which will activate the wells in an alternating lead-lag arrangement based on water level in the chlorine contact tank. The set points will be adjustable and will be set so the

wells run for at least 2 minutes (the recommended minimum for pumps 1.5 HP and larger). The power to the chlorine pump will be interlocked to operation of the wells.

A duplex pumping system will be installed to draw water from the chlorine contact tank and pressurize the building plumbing. The system will consist of two 3HP variable speed pumps, with a design point of 25 gpm at 155 ft TDH each. When running together, they will be capable of supplying approximately 75 gpm at 145 feet TDH. The pumps will ramp down as needed as demand drops, which will be measured using a pressure transmitter downstream of the pumps. The pump system will be configured to meet a minimum pressure of 35 psi for the flush valve toilet operation, and a maximum of 65 psi to prevent damage to plumbing joints.

To provide a buffer and prevent short-cycling of the booster pumps, a 45 gallon, above-ground, hydropneumatic bladder tank will be installed parallel to the discharge of the duplex pumping system. This will be sized to accept 5 gpm from a booster pump for a duration of two minutes (after which the VFD minimum speed signal will be tripped and the pump will shut down). The hydropneumatic tank will similarly provide 10 gallons of water back into the plumbing system (effectively one or two toilet flushes) before the pump restarts. The hydropneumatic tank will be pre-charged to 38 PSI.

Since the operating condition for the well pumps will change as a result of the non-pressurized tank, a backpressure valve will be installed upstream of the new tank to prevent the well pumps from cavitating due to pump overrun. A 1-inch emergency pressure relief valve will recirculate water from the booster pumps back to the tank if there is a malfunction to protect the building piping.

No backup power is being provided since this is a non-essential water system. In the event the system is out of service in the future, temporary toilets will be provided to serve travelers at this rest area.

Outbuilding Enclosure

The rest area does not have any space for the new chlorine contact tank. As such a new heated and insulated outbuilding will be constructed for the tank, booster pumps, and other associated equipment. The building is approximately 10 feet from the existing building (an extension was not feasible due to the existing roof design). The chlorine pump and tank will be installed in the existing building's mechanical room, so the discharge tubing will be routed through a buried PVC sleeve to the new outbuilding. The sleeve will be sloped back to the existing building, where a leak sensor will be installed in the sleeve sump.

Standards

All water piping installation will be completed in accordance with the latest version of American Water Works Association (AWWA) Standards and the 10 State Standards. A minimum of two water samples, collected 24 hours apart, will be tested for total coliform bacteria. Testing for VOCs will also be conducted if solvent welded PVC piping is used during construction.

EQUIPMENT DATA SHEET

Client:	New York State Office of General Services
Project:	Wallkill Rest Area Tank Replacement - 061658
Location(s):	NYS I-84

Equipment Name:	Aquavar e-ABII VFD Booster Pump	Quantity:	2
Material Handled:	Potable Water		
Size	3 HP, 1.25" discharge, 1.5" suction		

Manufacturer; Size; Configuration; Model No.:
Xylem, 3 HP, 1.25" discharge, 1.5" suction, horizontal, model 3AVN31OHMO3

Power Requirements (hp, voltage, phase):
3 hp, 230V, 3 phase

Drive (constant/variable speed, direct/belt):
Variable Frequency Drive

Speed, RPM:	3600

Support Utilities Required (seal water, drain, compressed air):
Electric & mechanical modules, booster pumps, flanges, flowmeter, guages,

Equipment Weight (lbs):	50
Noise Level (decibals):	N/A

Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):
Concrete housing pad, pump and motor housing

Miscellanous Information Requirements:

Attachment Checklist:		
	Design Calculations (on CHA Calc Paper)	X
	Manufacturer Data, Catalog Cut Sheets, Etc.	X
	Manufacturer Equipment Cost Quotation	X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	4/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:

Completed By:	KSM			**Job No:**	64396
Checked By:	ETH			**Page**	1 of 4
Project Name:	Wallkill Restroom Bldg			**Date:**	1-Aug-20

Subject: Wallkill Restroom 45 psi Inlet Pressure System Curve Calculations

Data: Enter data in shaded cells only

Set Point	50 psi
psi to ft conv.	2.31 ft/psi
Min psi	35
Max psi	65

Pump Type: Submersible
Motor Type: VFD

Pump System Criteria:

Suction piping size (in):	N/A	
Suction piping length (ft):	N/A	
Pipe size (in):	2	
Pipe Length (ft):	150	
"c" factor used:	130	Copper

Elevations
Static Discharge Head= 115.50 ft based on psi to ft conversion

Flow Range
Maximum Flow = 75 gpm
Minimum Flow = 10 gpm

Minimum Pipe Size = 2 inch
Dia = 0.17 ft.
Area = 0.022 sq. ft.

SYSTEM CURVE

Flow	*Suction*			*Discharge*				*System Curve Data*			
Flow (gpm)	Static Suction Head (ft)	Minor Losses (ft)	Total Suction Head (ft)	Flow (gpm)	Static Disch. Head (ft)	Pipe Friction + Minor Losses (ft)	Total Discharge Head (ft)	Total Dynamic Head (ft)	Pressure (psi)	Flow (cfs)	Velocity (fps)
0	0.0	0.0	0.0	0	115.5	0.0	115.5	115.5	50.0	0.000	0.0
20	0.0	0.0	0.0	20	115.5	3.9	119.4	119.4	51.7	0.045	2.042
40	0.0	0.0	0.0	40	115.5	14.0	129.5	129.5	56.1	0.089	4.1
60	0.0	0.0	0.0	60	115.5	29.7	145.2	145.2	62.9	0.134	6.1
80	0.0	0.0	0.0	80	115.5	50.6	166.1	166.1	72.0	0.178	8.2
100	0.0	0.0	0.0	100	115.5	76.4	191.9	191.9	83.2	0.223	10.2
120	0.0	0.0	0.0	120	115.5	107.1	222.6	222.6	96.5	0.267	12.3
140	0.0	0.0	0.0	140	115.5	142.4	257.9	257.9	111.8	0.312	14.3
160	0.0	0.0	0.0	160	115.5	182.4	297.9	297.9	129.1	0.356	16.3
180	0.0	0.0	0.0	180	115.5	226.8	342.3	342.3	148.3	0.401	18.4
200	0.0	0.0	0.0	200	115.5	275.6	391.1	391.1	169.5	0.446	20.4

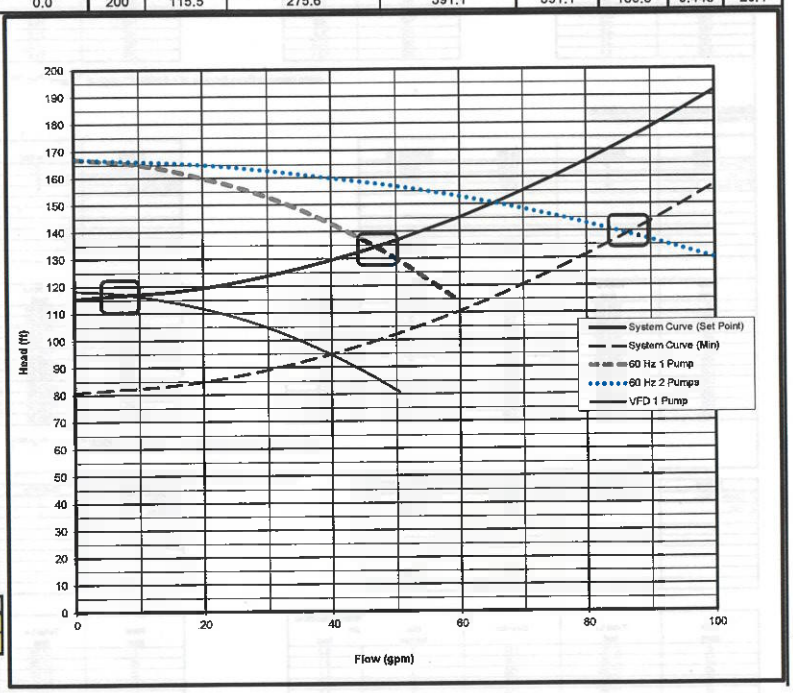
Pump Selection:

Make:	Xylem
Model No.:	3AVN310HM03
Quantity:	2
Pumps On:	2
Horsepower:	3.00
Hertz:	60
Phase:	3
Voltage:	230
RPM:	3600
Impeller Type/Size:	V

Pump Curve	(1 Pump Operating)
60 Hz	
Flow (gpm)	Head (ft)
0	167.0
10	165.0
20	160.0
30	153.0
40	143.0
50	130.0
60	114.0

Pump Curve	(2 Pumps Operating)
60 Hz	
Flow (gpm)	Head (ft)
0	167.0
20	165.0
40	160.0
60	153.0
80	143.0
100	130.0
120	114.0

Operating Points	Flow (gpm)	TDH (ft)
1 Pump on	34	149
2 Pumps on	48	158



Pump Curve	(1 Pump Operating)	VFD
50.5		Hz
Flow (gpm)	Head (ft)	
0	118	
8	117	
17	113	
25	108	
34	101	
42	92	
51	81	

Pump Curve	(2 Pump Operating)	VFD
47.5		Hz
Flow (gpm)	Head (ft)	
0	105	
17	103	
34	100	
51	96	
67	90	
84	81	
101	71	

Operating Points	Flow (gpm)	TDH (ft)
1 Pump on	3	104
2 Pumps on	5	105

Completed By:	KSM	**Job No:**	64396
Checked By:	ETH	**Page:**	2 of 4
Project Name:	Wallkill Restroom Bldg	**Date:**	1-Aug-20
Subject:	Wallkill Restroom Friction and Minor Losses		

Friction losses in the discharge piping:

Pipe Diameter (in):	3
Length (ft):	40
c - factor:	130

Flow gpm	Pipe Friction Loss (ft)
0	0.0
20	0.1
40	0.2
60	0.5
80	0.8
100	1.2
120	1.7
140	2.3
160	2.9
180	3.6
200	4.4

Pipe Diameter (in):	2.5
Length (ft):	90
c - factor:	130

Flow gpm	Pipe Friction Loss (ft)
0	0.0
20	0.2
40	0.7
60	1.4
80	2.5
100	3.7
120	5.2
140	6.9
160	8.9
180	11.0
200	13.4

Pipe Diameter (in):	2
Length (ft):	40
c - factor:	130

Flow gpm	Pipe Friction Loss (ft)
0	0.0
20	0.4
40	1.8
60	3.4
80	5.8
100	8.8
120	12.4
140	16.4
160	21.0
180	26.2
200	31.8

Pipe Diameter (in):	1.5
Length (ft):	20
c - factor:	130

Flow gpm	Pipe Friction Loss (ft)
0	0.0
20	0.9
40	3.3
60	6.9
80	11.8
100	17.9
120	25.0
140	33.3
160	42.8
180	53.0
200	64.4

(using Hazen-Williams formula) $hf = 0.002083*L(100/C)^{1.85}*(gpm^{1.85}/d^{4.8655})$

Friction losses in the discharge fittings:

Le values from Engineering Toolbox

Fitting	Quantity	Le (ft)	Total Le (ft)
3" Check Valve	2	14.50	29.00
3" Tee	2	15.00	30.00
3" 90 Bend	5	9.00	45.00
		Total Le	104.00

Flow gpm	Total Le feet	C-factor	Dia. inches	Minor Headloss feet
0	104.00	130	3	0.0
20	104.00	130	3	0.2
40	104.00	130	3	0.8
60	104.00	130	3	1.2
80	104.00	130	3	2.1
100	104.00	130	3	3.2
120	104.00	130	3	4.5
140	104.00	130	3	5.9
160	104.00	130	3	7.6
180	104.00	130	3	9.5
200	104.00	130	3	11.6

Fitting	Quantity	Le (ft)	Total Le (ft)
2.5" Check Valve	6	11.50	69.00
2.5" Tee	6	12.00	72.00
2.5" 90 Bend	2	7.00	14.00
		Total Le	155.00

Flow gpm	Total Le feet	C-factor	Dia. inches	Minor Headloss (ft) feet
0	155.00	130	2.5	0.0
20	155.00	130	2.5	0.6
40	155.00	130	2.5	2.1
60	155.00	130	2.5	4.5
80	155.00	130	2.5	7.6
100	155.00	130	2.5	11.5
120	155.00	130	2.5	16.2
140	155.00	130	2.5	21.5
160	155.00	130	2.5	27.5
180	155.00	130	2.5	34.2
200	155.00	130	2.5	41.8

(using Hazen-Williams formula) $hf = 0.002083*L(100/C)^{1.85}*(gpm^{1.85}/d^{4.8655})$

Fitting	Quantity	Le (ft)	Total Le (ft)
2" Check Valve	1	9.00	9.00
2" Tee	2	9.00	18.00
		Total Le	27.00

Flow gpm	Total Le feet	C-factor	Dia. inches	Minor Headloss (ft) feet
0	27.00	130	2	0.0
20	27.00	130	2	0.3
40	27.00	130	2	1.1
60	27.00	130	2	2.3
80	27.00	130	2	3.9
100	27.00	130	2	5.9
120	27.00	130	2	8.3
140	27.00	130	2	11.1
160	27.00	130	2	14.2
180	27.00	130	2	17.7
200	27.00	130	2	21.5

Fitting	Quantity	Le (ft)	Total Le (ft)
1.5" Check Valve	2	6.50	13.00
1.5" Tee	2	7.00	14.00
		Total Le	27.00

Flow gpm	Total Le feet	C-factor	Dia. inches	Minor Headloss (ft) feet
0	27.00	130	1.5	0.0
20	27.00	130	1.5	1.2
40	27.00	130	1.5	4.4
60	27.00	130	1.5	9.4
80	27.00	130	1.5	16.0
100	27.00	130	1.5	24.1
120	27.00	130	1.5	33.8
140	27.00	130	1.5	45.0
160	27.00	130	1.5	57.6
180	27.00	130	1.5	71.6
200	27.00	130	1.5	87.0

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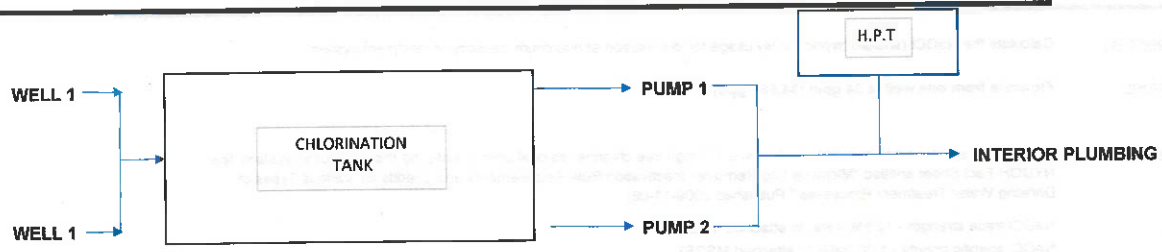
Checked By:	ETH		**Page:**	3 of	4
Project Name:	Wallkill Restroom		**Date:**	1-Aug-20	
Subject:	Wallkill Restroom Tank Sizing Calculations and Cl_2 Feed Rate				

Option 1:



Objective: Determine size of chlorination tank and hydro-pneumatic bladder tank

Assumptions:

Groundwater Temperature	5	deg C	assume winter 40F
pH	7		
Chlorine Concentration (C)	1.0	ppm	
Acceptance Factor (Pressure On)	45	psi	
Acceptance Factor (Pressure Off)	65	psi	
Baffling Factor	0.3		
CT	8		

Existing Fixtures:

		WSFU's*	
Toilets	9	10	90
Urinals	4	5	20
Sinks	4	2	8
Hose bibbs	4	2.5	10
Drinking fountains	2	0.25	0.5
		total WSFU's:	128.5

*WSFU's = water supply fixture units

*Data based on NYS DOS 2019 Plumbing Codes Table E103.3(2)

Tables 4A-4D
Chemical Disinfectants-Virus Inactivation
Where CT = Residual at or prior to first user (mg/l) x Contact Time (Minutes)
Interpolation between temperature and CT values is acceptable

Table 4A: CT values for inactivation of viruses by free chlorine, pH 6 – 9

Log inactivation	1°C	5°C	10°C	15°C	20°C	25°C
2	5.8	4.0	3.0	2.0	1.0	1.0
3	8.7	6.0	4.0	3.0	2.0	1.0
3.5	*10.2*	*7.0*	*5.0*	*3.5*	*2.5*	*1.5*
4	11.6	8.0	6.0	4.0	3.0	2.0

Table 6
Baffling Factors for Chemical Disinfectants

Baffling Condition	T10/T	Baffling Description
Unbaffled (mixed flow)	0.1	None, agitated basin, very low length to width ratio, high inlet and outlet flow velocities. Can be approximately achieved in flash mix tank
Poor	0.3	Single or multiple unbaffled inlets and outlets, no intra-basin Baffles
Average	0.6	Baffled inlet or outlet with some intra-basin baffles
Superior	0.7	Perforated inlet baffle, serpentine or perforated intra-basin baffles, outlet weir or perforated launders
Perfect (plug flow)	1.0	Very high length to width ratio (pipeline flow), perforated inlet, outlet, and intra-basin baffles

T10 = Detention Time (Mins) of Segment * Baffling Factor
From EPA Guidance Manual Disinfectnt Profiling and Benchmarking, August 1999

1. Tables Taken from NYDOH Fact Sheet entitled "Microbial Log Removal/ Inactivation Rule Requirements and Credits for Various Types of Drinking Water Treatment Processes. Published 2009-11-06
2. These CT values for viruses achieve greater than a 99.99 percent inactivation.

https://www.dos.ny.gov/dcea/pdf/2020%20PCNYS%20June%202019.pdf

Calculations:

Peak Flowrate Based on WSFU's =	75	gpm
Contact Time =	8	minutes
Chlorination Tank Volume =	600	gallons
Baffled Chlorination Tank Volume =	2000	gallons
Flowrate From one Existing Well =	24	gpm
Flowrate From one Existing Well =	0.03456	MGD
Chlorine Feed Rate =	0.29	lbs/day
Chlorine Feed Rate =	0.012	lbs/hour

*Taken from NYS DOS 2019 Plumbing Codes Table E103.3(3) for Flushometer Valves

Acceptance Factor = 0.250941 $AF = 1 - \frac{Pon+14.7}{Poff+14.7}$

Required Tank Size (H.P.T.) =	39.85	gallons	assume 5gpm at 2 m cycle: therefore use 1 factor
use =	40	gallons	

Chlorine is added to water to kill any disease-causing organisms which may be pr water or may enter the water as it travels through the distribution system. The two most often used to describe the amount of chlorine added or required are milligra (mg/L) and pounds per day (lbs/day). To convert from mg/L to lbs/day, or vice ve following equation is used:

(mg/L Cl_2) (MGD flow) (8.34 lbs/gal) = lbs/day Cl_2

Completed By:	KSM		**Job No:**	64396	
Checked By:	ETH		**Page:**	4 of	4
Project Name:	Wallkill Restroom		**Date:**	1-Aug-20	
Subject:	NaOCl Chlorination - Pump & Tank Sizing				

Objective: Calculate the NaOCl (sodium hypochlorite) usage for disinfection at maximum capacity of treatment system

Known: **Flowrate from one well is 24 gpm (34,560 gpd)**

Assumptions: Chlorination system sized to maintain at least a 1.0 mg/l free chlorine residual prior to entering the distribution system. (per NYDOH Fact Sheet entitled "Microbial Log Removal/ Inactivation Rule Requirements and Credits for Various Types of Drinking Water Treatment Processes." Published 2009-11-06)

NaOCl trade strength - 12.5% (refer to attached MSDS)
NaOCl specific gravity - 1.20 (refer to attached MSDS)
Day tanks should hold not more than 30 hour supply (per "Recommended Standards for Water Works" - Part 5.1.11)

Calculations:

Step 1: **Calculate lb/day of Cl_2**

lb/day = (Dose, ppm) x (Flow, mgd) x (weight of water) Note: 1 mg/l = 1 ppm

flow (mgd)	0.035
dose (mg/l)	2
weight of water (lb/gal)	8.34

Cl_2 (lb/day) = 0.58

Step 2: **Calculate lb/day Cl_2 to lb/day NaOCl (convert using molecular weight ratio)**

$$\text{MW Ratio} = \frac{\text{NaOCl}}{\text{Cl2}}$$

$$\text{MW Ratio} = \frac{74.442}{70.906}$$

MW ratio = 1.05

$$\text{lb/day} = \frac{(Cl_2 \text{ use, lb/day}) \times (\text{MW Ratio})}{\text{Trade Strength, \%}}$$

Trade Strength (%) 0.125

NaOCl (lb/day) = 4.8

Step 3: **Calculate gal/day of NaOCl**

$$\text{gal/day} = \frac{\text{NaOCl use, lb/day}}{\text{ght of water, lb/gal) * NaOCl Specific Gr}}$$

NaOCl Specific Gravity 1.2

NaOCl (gal/day) = 0.48 *(assuming nonstop operation)*

Step 4: **Calculate gal/hr of NaOCl**

Pump run time (hr/day) = 24.0

$$\text{gal/hr} = \frac{\text{(gal/day)}}{\text{pump run time}}$$

NaOCl (gal/hr) = 0.020 ***(needed for chlorination at treatment system hydraulic capacity)***

Step 5: **Calculate Day Tank Size Based on 30-hour Supply**

Max Daily (gal/day) 0.48

Approx. Day Storage (gallon) = 0.6

xylem
Let's Solve Water

TECHNICAL BROCHURE
BAQUAeABII R6

** Available up to 100 GPM systems*

Aquavar e-ABII

VARIABLE SPEED CONSTANT PRESSURE SYSTEMS

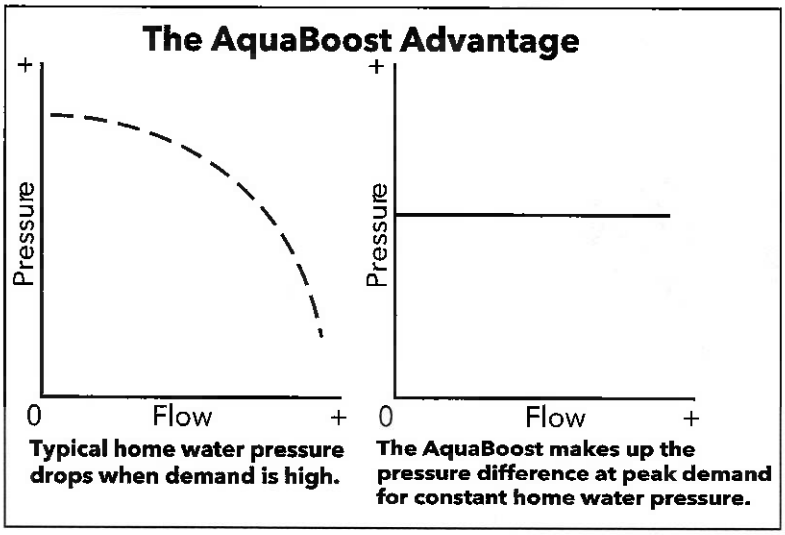
- 1 HP thru 5 HP - Pressure Booster Packages
- 1AB2 and 2AB2 Prewired Pump/Controller Kits

CentriPro
a xylem brand

FEATURES

The e-AB2 variable speed pump controller and complete booster package kits, provide an economical answer for municipal water district customers with low water pressure. Both domestic and light commercial applications can benefit. As water use increases, the controller changes pump speed to maintain pressure. Large supply tanks are eliminated and less wear and tear on your pump and motor.

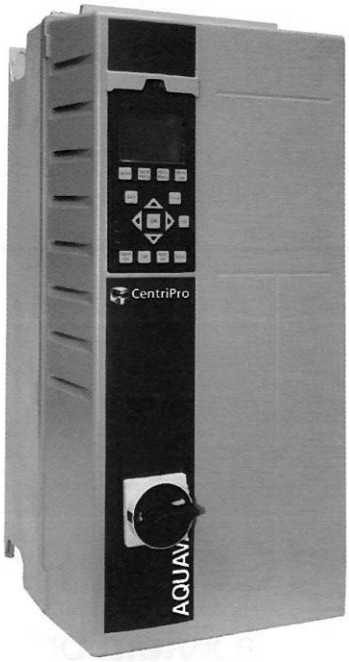
Think of it as "Cruise Control" for your pump! The e-AB2 is available with a range of flow rates to handle homes with up to four baths, irrigation, filtration and fire suppression systems. Light commercial applications up to 100 GPM at 55 PSI boost. The e-AB2 is available as either a separate controller or as part of a complete pump package with everything you need to plumb it to a domestic water line.



Typical home water pressure drops when demand is high.

The AquaBoost makes up the pressure difference at peak demand for constant home water pressure.

1 HP and 2 HP Controller



3 HP and 5 HP Controller

AQUAVAR IPC CONTROLLER PROVIDES CONSTANT PRESSURE CONTROL PLUS MORE FOR THE 3 HP AND 5 HP MOTOR SIZES (REPLACES 3AB2 AND 5AB2 CONTROLLER)

NEW FEATURES

- Programmed to motor electrical characteristics; just select set pressure.
- Application specific *"Start-Up Genie"* guides you through quick and easy commissioning
- Removable, graphical control panel with display
- Alarm Log records the last 5 alarms
- Hand on, Auto on, and Off buttons for easy pump operation at the keypad – No toggling between local and remote operation!
- Capable of controlling up to 2 fixed speed pumps, with one standard drive
- Duplex variable speed pumping control with auto lead/lag and alternate

e-AB2 HYDRAULIC SELECTION (e-HM and MCS)

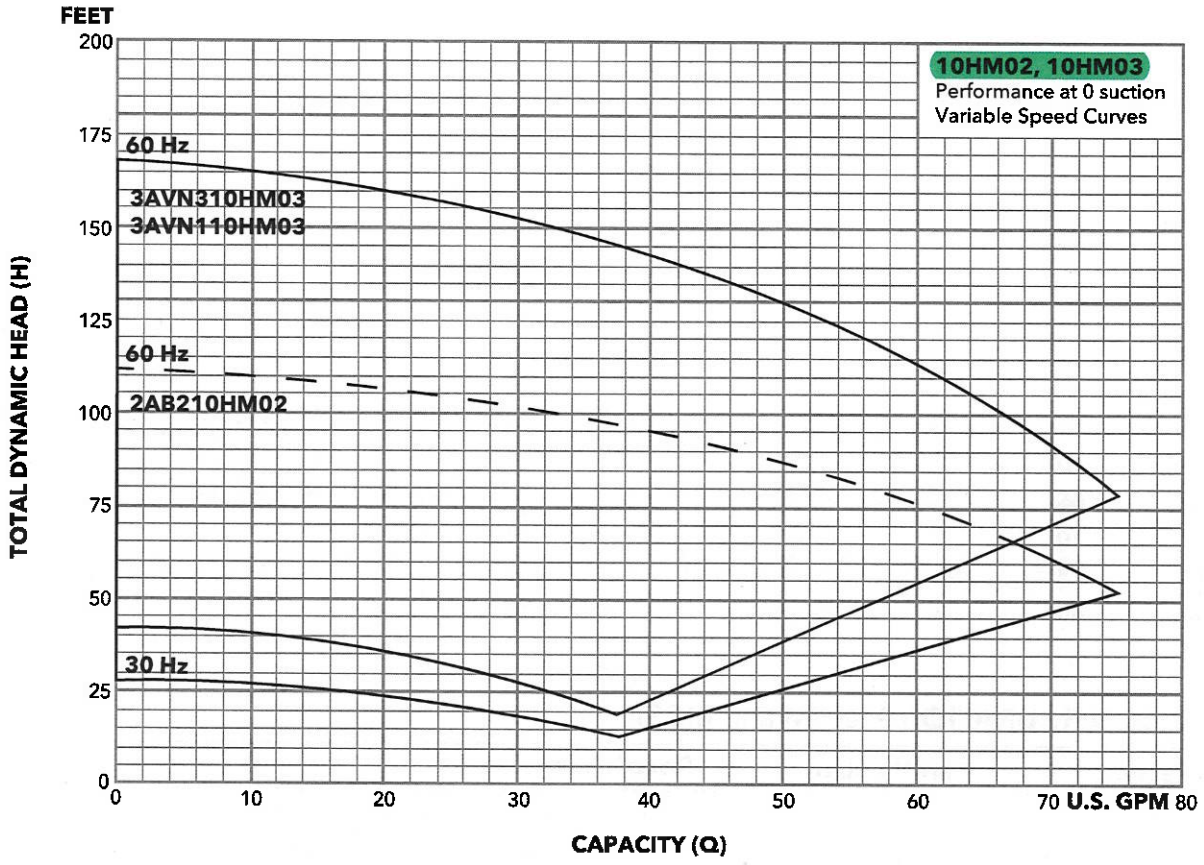
FEET	PSI BOOST	GPM									
		5-10	20	30	40	50	60	70	80	90	100
46	20	1	4	4	9	9	9	9	9	14	14
58	25	1	4	4	9	9	9	9	14	14	14
69	30	1	4	4	10	10	14	14	14	14	14
81	35	1	4	4	10	10	14	14	14	14	14
92	40	2	4	5	11	11	14	14	14	14	14
104	45	2	5	5	11	11	14	14	14	14	14
116	50	2	5	5	11	11	14	14	14	14	15
127	55	2	5	6	11	11	14	14	15	15	15
139	60	3	6	6	12	12	15	15	15	15	
150	65	3	6	7	12	12	15	15	15		
162	70	3	6	7	12	12	15	15	15		
173	75	3	7	8	12	12	13				
185	80	3	7	8	12	13	13				

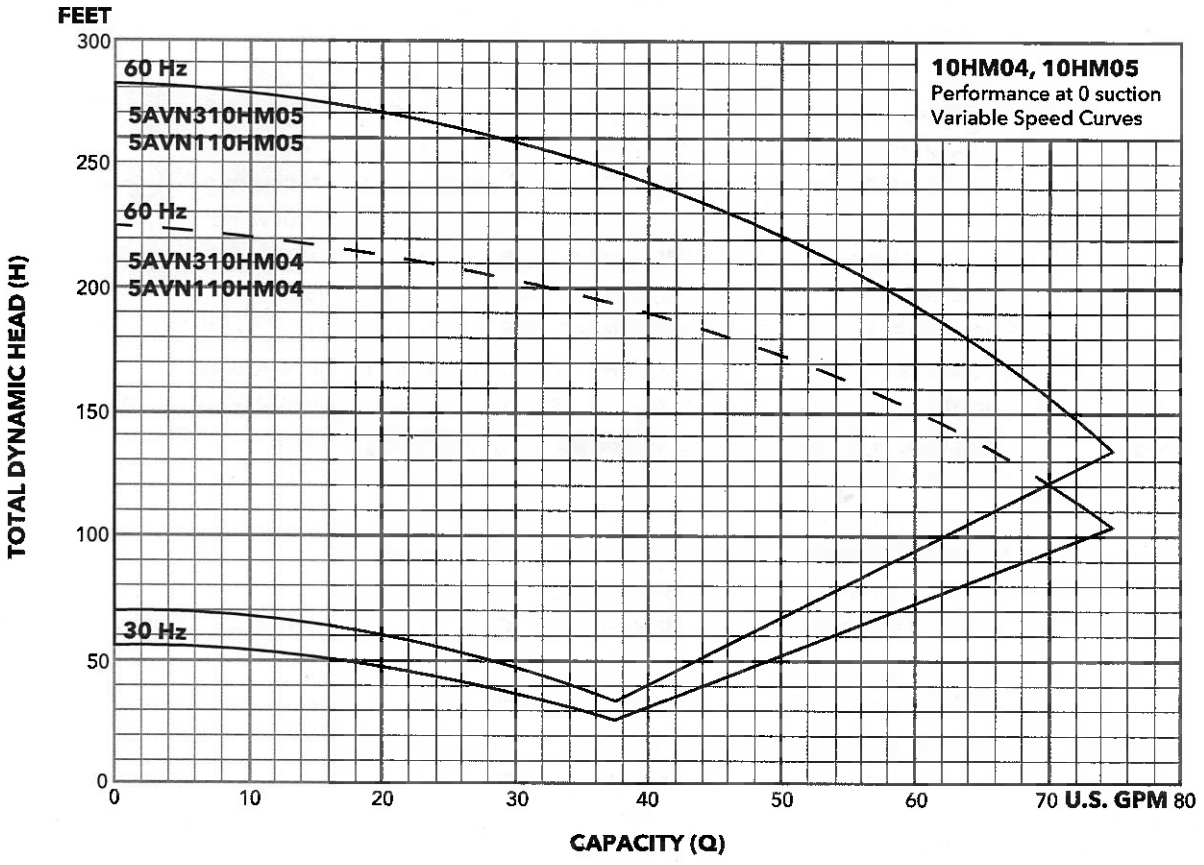
e-AB2 CONFIGURATIONS (e-HM and MCS)

Selection	Part Number	Description
1	1151AB21HM04	115V 1HP 1" disch, 1" suct V6P N3R wired
	1AB21HM04	230V 1HP 1" disch, 1" suct V6P N3R wired
2	1151AB21HM06	115V 1HP 1" disch, 1" suct V6P N3R wired
	1AB21HM06	230V 1HP 1" disch, 1" suct V6P N3R wired
3	2AB23HM06	230V 2HP 1" disch, 1" suct V6P N3R wired
4	1151AB25HM03	115V 1HP 1" disch, 1.25" suct V15P N3R wired
	1AB25HM03	230V 1HP 1" disch, 1.25" suct V15P N3R wired
5	2AB25HM04	230V 2HP 1" disch, 1.25" suct V15P N3R wired
6	2AB25HM05	230V 2HP 1" disch, 1.25" suct V15P N3R wired
7	2AB25HM06	230V 2HP 1" disch, 1.25" suct V15P N3R wired
8	3AVN35HM07	230V 3HP 1" disch, 1.25" suct IPC-N3R
	3AVN15HM07	230V 3HP 1" disch, 1.25" suct IPC-N1
9	2AB22MS1G2D2	230V 2HP 1.25" disch, 1.5" suct V15P N3R wired
10	2AB210HM02	230V 2HP 1.25" disch, 1.5" suct V15P N3R wired
11	3AVN310HM03	230V 3HP 1.25" disch, 1.5" suct IPC-N3R
	3AVN110HM03	230V 3HP 1.25" disch, 1.5" suct IPC-N1
12	5AVN310HM04	230V 5HP 1.25" disch, 1.5" suct IPC-N3R
	5AVN110HM04	230V 5HP 1.25" disch, 1.5" suct IPC-N1
13	5AVN310HM05	230V 5HP 1.25" disch, 1.5" suct IPC-N3R
	5AVN110HM05	230V 5HP 1.25" disch, 1.5" suct IPC-N1
14	5AVN32MS1J2K2	230V 5HP 1.25" disch, 1.5" suct IPC-N3R
	5AVN12MS1J2K2	230v 5HP 1.25" disch, 1.5" suct IPC-N1
15	5AVN315HM03	230V 5HP 1.5" disch, 2" suct IPC-N3R
	5AVN115HM03	230V 5HP 1.5" disch, 2" suct IPC-N1

** 1 HP available in 115 volt input models. Items 8, 11 thru 15 do not include tank. Recommend bladder tank, sized to 20% of pump flow (gpm). Pressure Transducer supplied with all configurations.*

***NOTE:** PSI is boosting pressure, NOT total system pressure.*


FEET
TOTAL DYNAMIC HEAD (H)
200
175
150
125
100
75
50
25
0
10HM02, 10HM03
Performance at 0 suction
Variable Speed Curves
60 Hz
3AVN310HM03
3AVN110HM03
60 Hz
2AB210HM02
30 Hz
0
10
20
30
40
50
60
70
U.S. GPM
80
CAPACITY (Q)


FEET
TOTAL DYNAMIC HEAD (H)
300
250
200
150
100
50
0
10HM04, 10HM05
Performance at 0 suction
Variable Speed Curves
60 Hz
5AVN310HM05
5AVN110HM05
60 Hz
5AVN310HM04
5AVN110HM04
30 Hz
0
10
20
30
40
50
60
70
U.S. GPM
80
CAPACITY (Q)

xylem
Let's Solve Water

TECHNICAL BROCHURE
BCPAQIPC R7

AQUAVAR IPC

Variable Speed Controller

CentriPro
a xylem brand

The Aquavar IPC variable speed controller brings the latest in pump drive technology and programming. The drive and interface are designed to give you advanced capabilities that help you effectively and efficiently operate your system.

Optimized for Pumps

- Wide range of standard and permanent magnet motors with power up to 90 kw / 450 hp
- Developed by pump experts and optimized for controlling pumps
- Submersible and above ground applications

Quick set up and ease of use

- Easier start-up and programming with Start-Up Genie
- Two wire multi-pump connection for faster installation
- Hand on, Off, and Auto-On buttons available for easy pump operation at the keypad. No toggling between local and remote operation

Helping to Improve Your Performance

- Multi-pump configuration for up to four (4) pumps - no need for PLC
- System redundancy with multi-master control in case of drive failure

Standard for every drive

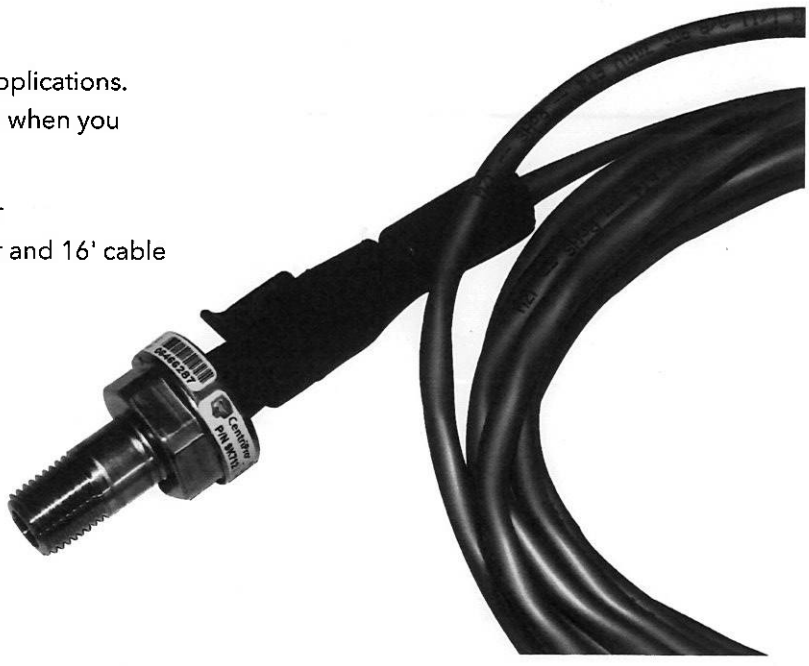
- Wide range of voltage and enclosure options
- True 208V coverage
- Dedicated single phase input
- Remote commissioning and monitoring with USB Connectivity and software
- In-panel or handheld keypad with backlit display
- Alarm Log for last 5 alarms and maintenance events
- EMC/RFI filters and Dual DC-link reactors to reduce drive noise emissions and interference I/O expansion cards, factory installed or field configured

TRANSDUCER

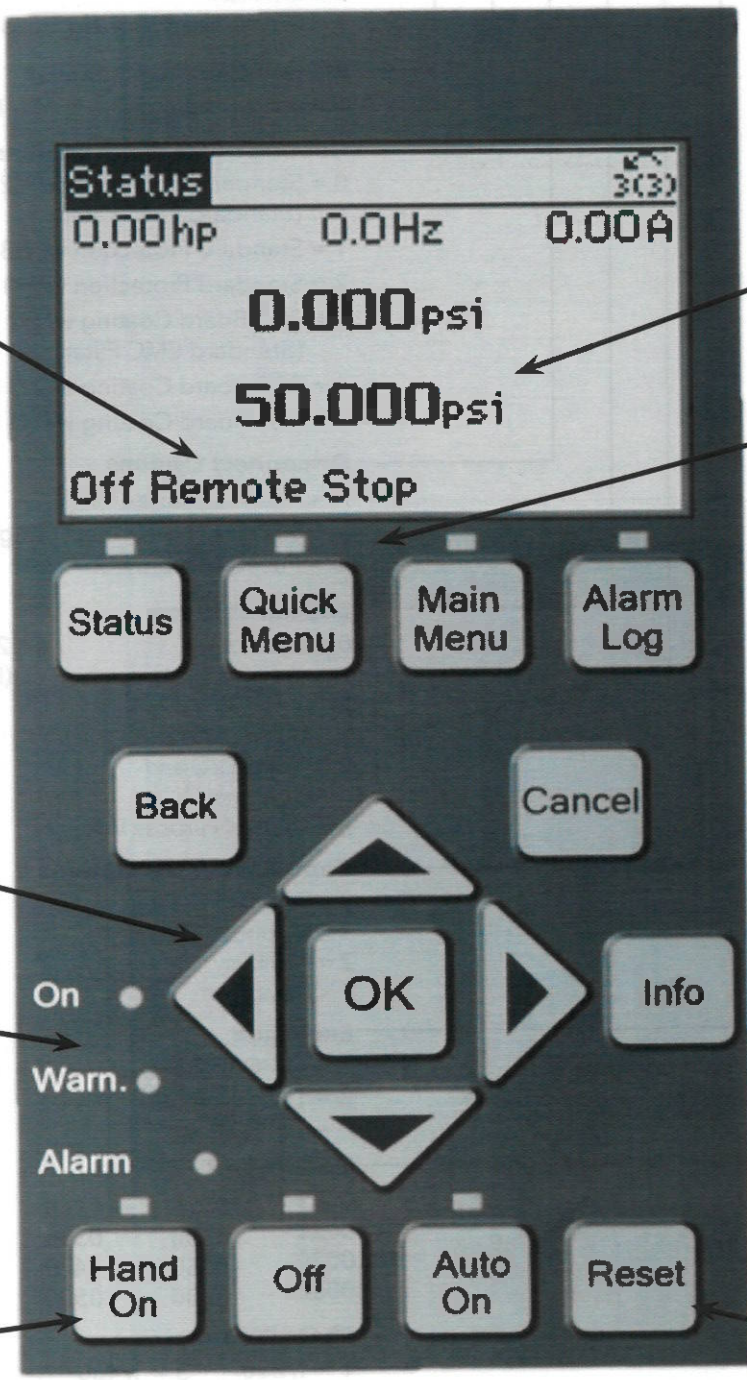
Includes: 4-20mA, 300psi transducer and 16' cable

Used for: Pressure transducer for constant pressure applications. Transducer will be delivered with your drive when you use the "1" Transducer character.

NOTE: 9K712 - Repair part number for the transducer
9K755 - Repair part number for the transducer and 16' cable



KEYPAD LAYOUT



Real Time Drive Status

Actual System Pressure and Setpoint Pressure Display

Quick access to Start-Up Genie, Personal Menu and drive parameters

4-way directional buttons for scrolling parameters

Info button provides on-board descriptions of parameters

LEDs for On, Warning and Alarm

Easily accessible Hand/Off/Auto Buttons

Alarm Reset

NOMENCLATURE

Example Product Code

AV A 2 0015 D 0 F 0 D 0 X 1

Transducer
1 = Transducer 2 = No Transducer

Motor Mounting Options*
X = No Accessories M = Motor Mount Hardware

Coating / EMC Filter Options**
0 = Standard Protection w/ H2 EMC Filter (Standard EMC Filter)
1 = Standard Protection w/ H3 EMC Filter
2 = Standard Protection w/ H1 EMC Filter
3 = 3C3 Board Coating w/ H2 EMC Filter (Standard EMC Filter)
4 = 3C3 Board Coating w/ H3 EMC Filter
5 = 3C3 Board Coating w/ H1 EMC Filter

Disconnect Options
X = No Accessories
S = Standard Disconnect (Single Phase Only)
D = Fused Disconnect

Backup Options
0 = No Backup 4 = 24VDC Backup (Requires External Power)

Input/Output Options
X = No Additional I/O
A = Analog I/O and Real-time Clock
B = General Purpose I/O
C = PTC Thermistor Card
D = PT100 Sensor Input
E = Relay Card
F = Co-Processor

Communications Options
0 = Standard Communication
1 = Modbus TCP
2 = Profibus
3 = DeviceNet
4 = LonWorks
5 = Profinet
6 = Ethernet IP
7 = Co-Processor

Enclosure
A = TYPE 1 (IP21)
B = TYPE 12 (IP55)
C = TYPE 3R
D = TYPE 4X (IP66)
E = IP20 (Chassis)

Nominal HP

0015	0075	0250	0600
0020	0100	0300	0750
0030	0150	0400	1000
0050	0200	0500	1250

Phase/Voltage
1 = 1/230 3 = 1/460*** 5 = 3/575
2 = 3/230 4 = 3/380-460

Type - A= Advanced B=Basic Drive

Model - AV

* Motor mounted units are not available in the initial launch. Product news will be issued when this configuration is available.
** 575V and single phase 10, 20, and 30HP are not avaialble with EMC filter. These are sold without filter as standard.
*** Single phase 460V are not available.

PRODUCT CHART - TYPE 4X

Input Voltage	Input Phase	TYPE 4X Base Model	Continuous Output Amps @ 45°C Ambient	Continuous Output Amps @ 50°C Ambient	Nominal Surface Motor HP*	Nominal Submersible Motor HP* 4" / 6" & Up	Frame Size	DV / DT Load Filter NEMA 3R**
208-230	1	AVA10015D0F0X0X1	6.6	5.9	1.5	1.5	A5	V1K8A03
		AVA10020D0F0X0X1	7.5	6.8	2	2	B1	V1K12A03
		AVA10030D0F0X0X1	10.6	9.5	3	3		V1K18A03
		AVA10050D0F0X0X1	16.7	15.0	5			V1K25A03
		AVA10075D0F0X0X1	24.2	21.8	7.5	5	B2	V1K35A03
		AVA10100D0F0X0X1	30.8	27.7	10	7.5 / 5	C3	V1K80A03
		AVA10200D0F0X0X1	59.4	53.5	20	10	C4	V1K110A03
		AVA10300D0F0X0X1	88	79.2	30	15 & 20		
208-230	3	AVA20015D0F0X0X1	6.6	5.9	1.5	1.5	A5	V1K8A03
		AVA20020D0F0X0X1	7.5	6.8	2	2		V1K12A03
		AVA20030D0F0X0X1	10.6	9.5	3	3		V1K18A03
		AVA20050D0F0X0X1	16.7	15.0	5		B1	V1K25A03
		AVA20075D0F0X0X1	24.2	21.8	7.5	5		V1K35A03
		AVA20100D0F0X0X1	30.8	27.7	10	7.5		V1K55A03
		AVA20150D0F0X0X1	46.2	41.6	15	10 / 15	B2	V1K80A03
		AVA20200D0F0X0X1	59.4	53.5	20	15	C1	V1K110A03
		AVA20250D0F0X0X1	74.8	67.3	25	20		V1K130A03
		AVA20300D0F0X0X1	88	79.2	30	25	C2	V1K160A03
		AVA20400D0F0X0X1	115	103.5	40	30		V1K200A03
		AVA20500D0F0X0X1	143	128.7	50			
		AVA20600D0F0X0X1	170	153.0	60			
380-460	3	AVA40015D0F0X0X1	2.7	2.4	1.5	1	A5	V1K8A03
		AVA40020D0F0X0X1	3.4	3.1	2	1.5		V1K12A03
		AVA40030D0F0X0X1	4.8	4.3	3	2		V1K18A03
		AVA40050D0F0X0X1	8.2	7.4	5	3	B1	V1K25A03
		AVA40075D0F0X0X1	11	9.9	7.5	5		V1K35A03
		AVA40100D0F0X0X1	14.5	13.1	10	7.5		
		AVA40150D0F0X0X1	21	18.9	15	10	B2	V1K55A03
		AVA40200D0F0X0X1	27	24.3	20	15	C1	V1K80A03
		AVA40250D0F0X0X1	34	30.6	25	20		V1K110A03
		AVA40300D0F0X0X1	40	36.0	30	25	C2	V1K130A03
		AVA40400D0F0X0X1	52	46.8	40	30		V1K160A03
		AVA40500D0F0X0X1	65	58.5	50	40		
		AVA40600D0F0X0X1	80	72.0	60	50		
		AVA40750D0F0X0X1	105	94.5	75	60		
		AVA41000D0F0X0X1	130	117.0	100	75		
		AVA41250D0F0X0X1	160	144.0	125	100		
575	3	AVA50015D0F0X0X1	2.4	2.2	1.5	1.5	A5	V1K8A03
		AVA50020D0F0X0X1	2.7	2.4	2			V1K12A03
		AVA50030D0F0X0X1	3.9	3.5	3	2	B1	V1K18A03
		AVA50050D0F0X0X1	6.1	5.5	5	3		V1K25A03
		AVA50075D0F0X0X1	9	8.1	7.5	5		V1K35A03
		AVA50100D0F0X0X1	11	9.9	10	7.5	B2	V1K55A03
		AVA50150D0F0X0X1	18	16.2	15			V1K80A03
		AVA50200D0F0X0X1	22	19.8	20		C1	V1K110A03
		AVA50250D0F0X0X1	27	24.3	25			V1K130A03
		AVA50300D0F0X0X1	34	30.6	30		C2	V1K160A03
		AVA50400D0F0X0X1	41	36.9	40			
		AVA50500D0F0X0X1	52	46.8	50			
		AVA50600D0F0X0X1	62	55.8	60			
		AVA50750D0F0X0X1	83	74.7	75			
		AVA51000D0F0X0X1	100	90.0	100			
		AVA51250D0F0X0X1	131	117.9	125			

* Nominal HP values are for reference only. Size Aquavar by maximum output amps of the motor.

** dv/dt filter recommended for applications with motor leads longer than 50'. It is recommended to use the dv/dt filter with all submersible applications.

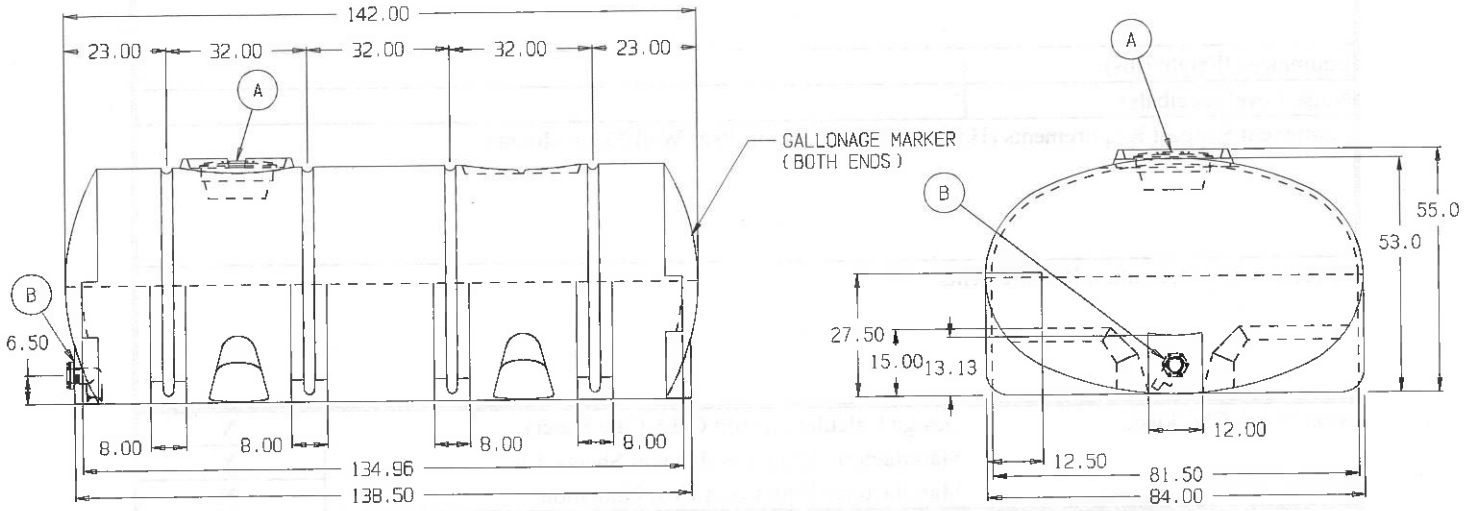
EQUIPMENT DATA SHEET			
Client:	New York State Office of General Services		
Project:	Wallkill Rest Area Tank Replacement - 061658		
Location(s):	NYS I-84		
Equipment Name:	2,000 Gallon Elliptical Leg Tank	Quantity:	1
Material Handled:	Potable Water		
Size	2,000 Gallons		
Manufacturer; Size; Configuration; Model No.: Snyder Industrial, 2,000 gallons, Horizontal, sku # 1002300N			
Power Requirements (hp, voltage, phase): N/A			
Drive (constant/variable speed, direct/belt): N/A			
Speed, RPM:	N/A		
Support Utilities Required (seal water, drain, compressed air): Overflow discharge port			
Equipment Weight (lbs):	644 (dry)		
Noise Level (decibals):	N/A		
Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount): Housing Pad			
Miscellanous Information Requirements:			

Attachment Checklist:		
	Design Calculations (on CHA Calc Paper)	X
	Manufacturer Data, Catalog Cut Sheets, Etc.	X
	Manufacturer Equipment Cost Quotation	X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	4/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:

SNYDER INDUSTRIES INC.



STANDARD OUTLET SPECIFICATION * H *

A. 18" PE THREADED-VENTED MANWAY W/15" ACCESS [P/N 347000871.
B. 3" PP DBL FLANGED BOLTED FTG SHORT SIPHON TUBE ASSY W/EPDM GASKET & SS BOLTS [P/N 347008441.

(all dimensions in inches)

BASE FITTINGS TO BE LEFT INSTALLED AT TIME OF SHIPMENT PER SII PROCEDURE

2000 GALLON ELLIPTICAL LEG TANK

PART # TANK: 1002300C-- (M)

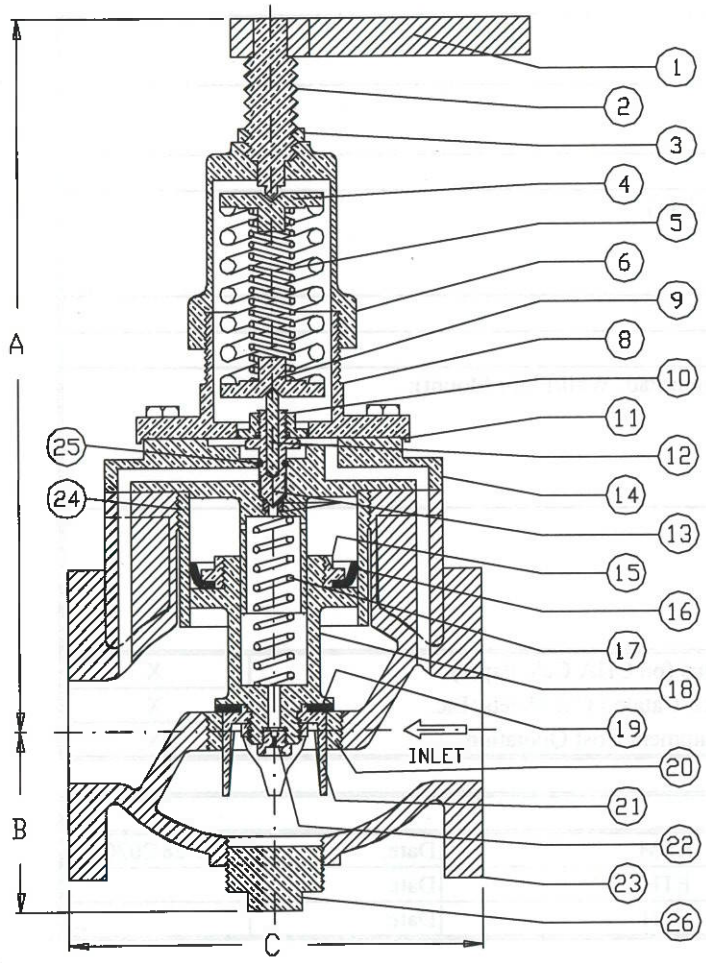
REF#: 00000

11/21/08

EQUIPMENT DATA SHEET				
Client:	New York State Office of General Services			
Project:	Wallkill Rest Area Tank Replacement - 064396			
Location(s):	NYS I-84			
Equipment Name:	Back Pressure Sustaining Valve		Quantity:	1
Material Handled:	Well Water			
Size	3"			
Manufacturer; Size; Configuration; Model No.: Ross Valve, 3", Horizontal, 23RWR				
Power Requirements (hp, voltage, phase): N/A				
Drive (constant/variable speed, direct/belt): N/A				
Speed, RPM:	N/A			
Support Utilities Required (seal water, drain, compressed air):				
Equipment Weight (lbs):	90			
Noise Level (decibals):	N/A			
Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):				
Miscellanous Information Requirements:				
Attachment Checklist:	Design Calculations (on CHA Calc Paper)			X
	Manufacturer Data, Catalog Cut Sheets, Etc.			X
	Manufacturer Equipment Cost Quotation			X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	7/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:



PART NO.	DESCRIPTION	QTY	MATERIAL
1	ADJUSTING HANDLE	1	BRONZE
2	ADJUSTING SCREW	1	BRONZE
3	LOCK NUT	1	BRONZE
4	TOP SPRING WASHER	1	BRONZE
5	ADJUSTING SPRINGS	1	STEEL
6	SPRING CHAMBER	1	BRONZE
8	DIAPHRAGM COVER	1	BRONZE
9	BOTTOM SPRING WASHER	1	BRONZE
10	DIAPHRAGM BUTTON	1	BRONZE
11	DIAPHRAGM	1	BRONZE
12	PILOT PIN	1	STAINLESS
13	PILOT STEM/SEAT/O-RING	1 SET	420SS/BUNA-N
14	DIAPHRAGM PLATE	1	BRONZE
15	CUP FOLLOWER	1	BRONZE
16	CUP PACKING	1	LEATHER
17	SPRING	1	BRONZE
18	STEM	1	BRONZE
19	SEAT PACKING	1	COMPOSITION
20	SEAT RING	1	STAINLESS
21	SEAT PACKING SUPPORT	1	BRONZE
22	STRAINER/ORIFICE	1	STAINLESS
23	SHELL	1	BRONZE
24	CYLINDER LINER	1	COMPOSITE
25	O-RING - PILOT	1	BUNA-N
26	BOTTOM PLUG	1	BRONZE

SIZE	ANSI CLASS	SHIPPING WEIGHT (LBS)	DIMENSIONS (INCHES) A	B	C
1-1/2	125	35	11-1/2	3-1/4	7-5/8
	250	42	11-1/2	3-1/4	8-1/8
	NPT	30	11-1/2	3-1/4	8-3/8
2	125	55	13	3-1/2	8
	250	65	13	3-1/2	8-3/8
	NPT	50	13	3-1/2	8
2-1/2	125	75	14	4-1/2	9-1/4
	250	85	14	4-1/2	9-7/8
	NPT	70	14	4-1/2	9-1/4
3	125	80	14	4-1/2	9-1/4
	250	90	14	4-1/2	9-7/8
	NPT	75	14	4-1/2	9-1/4

ROSS VALVE Mfg. Co., Inc.
6 OAKWOOD AVENUE - P. O. BOX 595 - TROY, NEW YORK 12181

NO SCALE	DRAWING 23RWR-STEL
DATE 3-3-58 30020	REVISED 1-17-03

MODEL 23RWR
RELIEF & BACK PRESSURE SUSTAINING VALVE

EQUIPMENT DATA SHEET			
Client:	New York State Office of General Services		
Project:	Wallkill Rest Area Tank Replacement - 064396		
Location(s):	NYS I-84		
Equipment Name:	Pulsafeeder Electronic Metering Pump	Quantity:	1
Material Handled:	Chlorine		
Size	0.5", 1'x1' L x H		
Manufacturer; Size; Configuration; Model No.: Pulsafeeder, 0.5" discharge 1' x 1' L x H, Horizontal, MP Series			
Power Requirements (hp, voltage, phase): N/A			
Drive (constant/variable speed, direct/belt): N/A			
Speed, RPM:	N/A		
Support Utilities Required (seal water, drain, compressed air):			
Equipment Weight (lbs):	50		
Noise Level (decibals):	N/A		
Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount): Wall Shelf			
Miscellanous Information Requirements:			

Attachment Checklist:		
	Design Calculations (on CHA Calc Paper)	X
	Manufacturer Data, Catalog Cut Sheets, Etc.	X
	Manufacturer Equipment Cost Quotation	X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	7/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:

PULSAFEEDER®

An IDEX Water & Wastewater Business

pulsafeeder.com

PULSAtron®

Electronic Metering Pump

Pulsafeeder Expertise

Technology is the key to delivering responsible products to the markets that we serve. Leading the way in the development of metering technologies, Pulsafeeder continues to set the standard for accuracy, reliability and safety.

Innovation is another hallmark of Pulsafeeder. Helping customers find a new approach to an old problem is what we do best.

Intertek 9700150 Intertek 9700150

PULSAtron Series Pumps

For over 20 years, the PULSAtron product line has evolved into philosophy of design that continues to set the standards for the entire industry. Our engineers have developed a guided check valve system with a proven 'seat and ball' design that ensures reliable and accurate metering year after year.

Our fin cooled Solenoid enclosure dissipates heat ensuring that the pressure handling capability of the pump can be maintained. The thermally protected Solenoid protects the pump from seizing up in extreme heat conditions with an automatic reset feature allowing the pump to resume operation upon cool-down. All PULSAtrons are tested and rated under hot conditions guaranteeing that the flow and pressure ratings meet the specifications.

Product Specifications

- Flows to 600 gpd (94.6 lph) on specific series
- Pressures to 250 psi (17 Bar) on specific models
- Accuracy +/- 2% at max capacity on E Plus, HV and MP Series. +/- 3% at max capacity on A Plus, C, C Plus, and E Series.

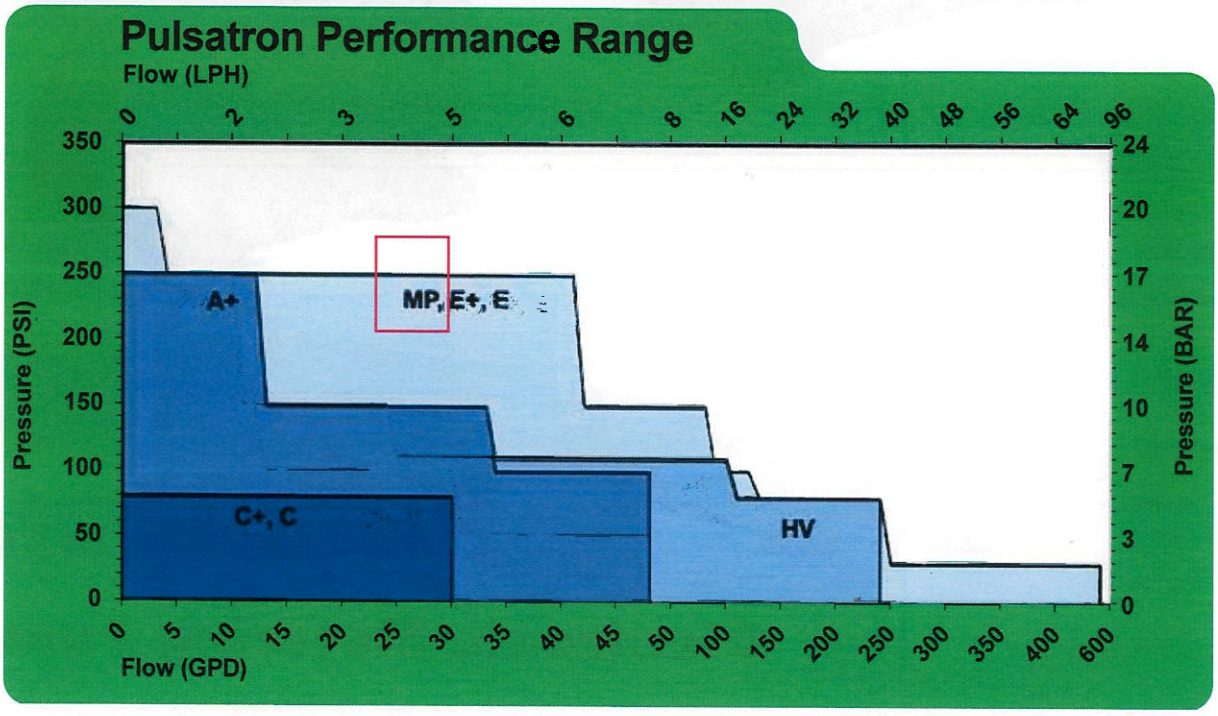
Materials of Construction

- Housing - PBT
- Head materials - GFPPL, PVC, PVDF, Viton, 316SS
- Seats materials - CSPE, TFE, Viton
- Ball materials - Alloy C, Ceramic, TFE, 316SS
- Diaphragm - PTFE faced CSPE

Typical Applications

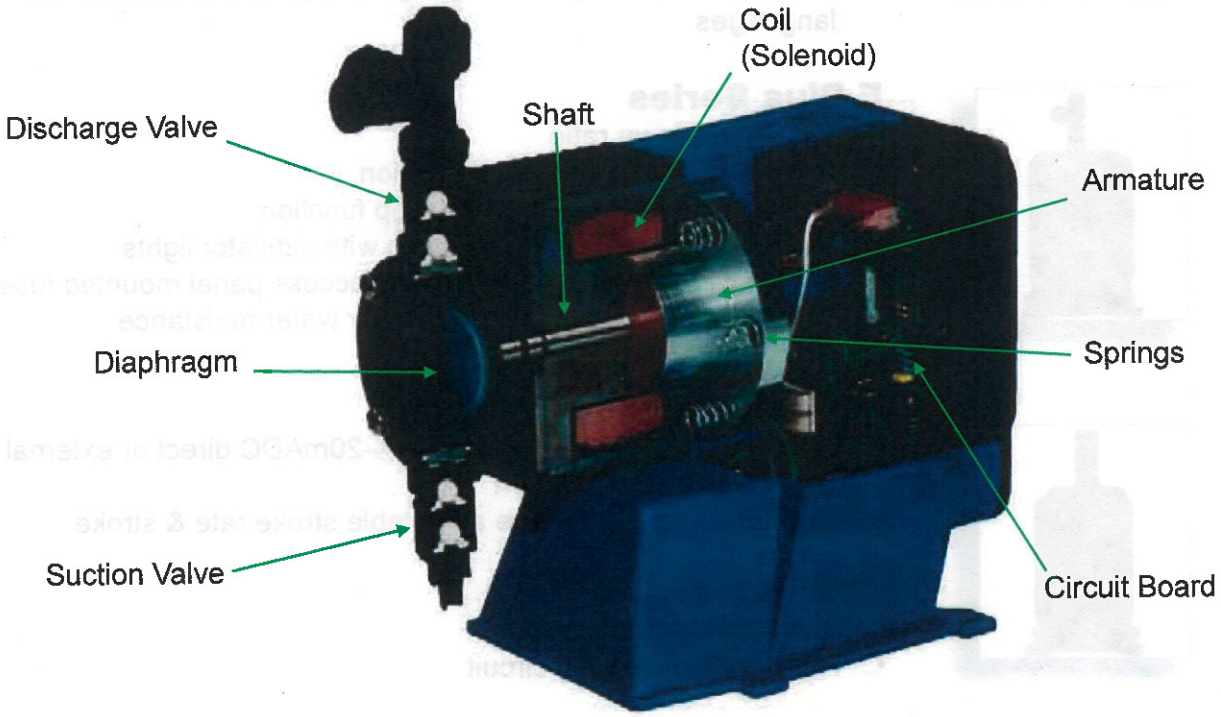
- Car Wash
- Water Conditioning
- Water Treatment
- Ware Wash

CSPE is generic formulation of Hypalon, a registered trademark of E.I. DuPont Company. Viton is a registered trademark of E.I. DuPont Company.



Diaphragm Metering Pump Technology

The PULSAtron family are solenoid powered diaphragm metering pumps. The key element which differentiates these pumps from other types is the TFE lined elastomer diaphragm. This diaphragm is sealed against the reagent head forming a seal-less, leak free pumping chamber. The solenoid driver is connected to the diaphragm to create the pumping motion. As the diaphragm moves away from the face of the reagent head, it creates a vacuum which closes the discharge check valve and opens the suction check valve, drawing the pumped fluid into the pumping chamber. As the solenoid forces the diaphragm toward the face of the reagent head, the suction check valve closes and the discharge check valve opens allowing the liquid to flow out the discharge valve.



PULSAtron Configurations

The Pulsatron is available in several different series.
Shown here are the Pulsatron MP Series, E Plus Series, HV Series, A Plus, and C Series.

Features & Benefits

MP Series

- Automatic control, fully scalable 4-20mADC, 20-4mADC or external pacing
- Manual control allows for a combined 1000:1 turndown
- Flow verification option is available on select sizes
- 16 character LCD display and indicator lights
- Relay and stop outputs
- Simple prompts in plain language and programmable in four languages

E Plus Series

- 100:1 turn down ratio
- Optional 4-20mA with stop function
- Optional external pacing with stop function
- Auto-Off-Manual selection switch with indicator lights
- Built in circuit protection with easy access panel mounted fuse
- Clear hinged cover over controls for water resistance

HV Series

- Automatic control, available with 4-20mADC direct or external pacing, with stop function
- Manual control by on-line adjustable stroke rate & stroke length
- Viscosities to 20,000 CPS
- Auto-Off-Manual switch
- Highly reliable timing circuit

A Plus, C Plus, E Series

- 100:1 turn down ratio
- Water resistant for outdoor installation
- Manual control by on-line adjustable stroke length and stroke rate
- Optional external pacing with Auto/Manual switch on A Plus
- Internally dampened to reduce noise

C Series

- 10:1 turn down ratio
- Optional automatic control by external pacing with prime switch
- Manual control by on-line adjustable stroke length
- Liquid low level option available to prevent loss of prime
- Internally dampened to reduce noise

EQUIPMENT DATA SHEET

Client:	New York State Office of General Services
Project:	Wallkill Rest Area Tank Replacement - 064396
Location(s):	NYS I-84

Equipment Name:	Polyethylene Tank Assembly	Quantity:	1
Material Handled:	Chlorine		
Size	10 Gallons		

Manufacturer; Size; Configuration; Model No.:
LMI, 10 gallons, Vertical, #27421

Power Requirements (hp, voltage, phase):
N/A

Drive (constant/variable speed, direct/belt):
N/A

Speed, RPM:	N/A

Support Utilities Required (seal water, drain, compressed air):

Equipment Weight (lbs):	7 (dry)
Noise Level (decibals):	N/A

Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):
Flat Bottom Wall Shelf

Miscellanous Information Requirements:

Attachment Checklist:	Design Calculations (on CHA Calc Paper)	X
	Manufacturer Data, Catalog Cut Sheets, Etc.	X
	Manufacturer Equipment Cost Quotation	X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	7/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

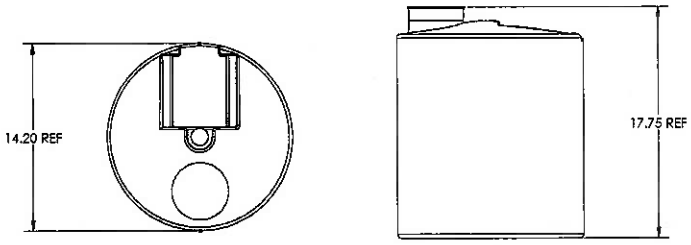
Revision Tracking			
Date	Description	Revised by:	Approved by:

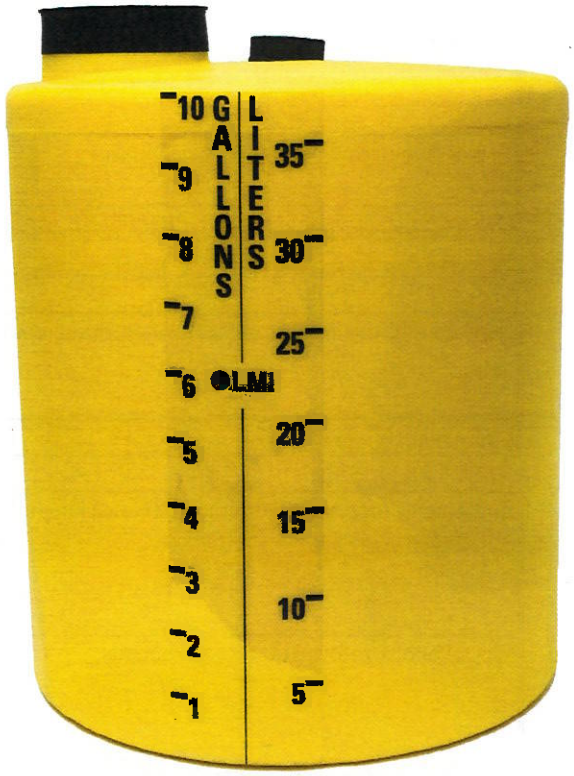
Information Sheet

Polyethylene Tank Assembly

NO. 27421
10 GALLON TANK ASSEMBLY

- Ultraviolet resistant, yellow polyethylene tank.
- Molded recesses for mounting of any LMI Series AA, ROYTRONIC® Series A, ROYTRONIC EXCEL™ Series AD, J, or P pump.
- Convenient and light weight, ships economically.
- Large fill hole at top allows easy replenishing of solution.
- Slightly translucent yet rugged design allows checking solution level at a glance.
- Certified to NSF/ANSI Standard 61 ad 372.





Model No. 27421 Tank Assembly
(Pump must be ordered separately.)

Shipping Weight: 7 lbs (3.2 kg)

NOTES:

1. Full, flat bottom support required.
2. Maximum solution/ambient temperature 110° F (43° C).
3. Minimum solution/ambient temperature 0° F (-18° C).
4. Not suitable for use with slurries, concentrated organic solvents, oils and related materials.

NSF®
Certified to NSF/ANSI 61 & 372

LMI
201 Ivyland Road
Ivyland, PA 18974 USA
TEL: (215) 293-0401
FAX: (215) 293-0445
http://www.lmipumps.com

Replaces same of Rev. D 6/2011
1250.E 9/2014

EQUIPMENT DATA SHEET

Client:	New York State Office of General Services
Project:	Wallkill Rest Area Tank Replacement - 064396
Location(s):	NYS I-84

Equipment Name:	Internal Pilot Operated Pressure Relief Valve	Quantity:	1
Material Handled:	Well Water and Potable Water		
Size	2"		

Manufacturer; Size; Configuration; Model No.:
Badger, 2", Horizontal, e-series

Power Requirements (hp, voltage, phase):
3.6 volt lithium thionyl chloride; battery is fully encapsulated within the register housing; not replaceable; 20-yr lifespan

Drive (constant/variable speed, direct/belt):
N/A

Speed, RPM:	N/A

Support Utilities Required (seal water, drain, compressed air):

Equipment Weight (lbs):	11.9 lbs
Noise Level (decibals):	N/A

Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):
Wall mount

Miscellanous Information Requirements:

Attachment Checklist:	Design Calculations (on CHA Calc Paper)	X
	Manufacturer Data, Catalog Cut Sheets, Etc.	X
	Manufacturer Equipment Cost Quotation	X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	9/11/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:

Badger Meter

E-Series® Ultrasonic Meter

Cold Water Stainless Steel Meter, 1-1/2 and 2 inch

DESCRIPTION

The E-Series® Ultrasonic meter uses solid-state technology in a compact, totally encapsulated, weatherproof, and UV-resistant housing, suitable for residential and commercial applications. Electronic metering provides information—such as rate of flow and reverse flow indication—and data not typically available through traditional, mechanical meters and registers. Electronic metering eliminates measurement errors due to sand, suspended particles and pressure fluctuations.

The Ultrasonic 1-1/2 and 2 inch meters feature:

- Minimum extended low-flow rate lower than typical positive displacement meters.
- Simplified one-piece electronic meter and register that are integral to the meter body and virtually maintenance free.
- Sealed, non-removable, tamper-protected meter and register.
- Easy-to-read, 9-digit LCD display presents consumption, rate of flow, reverse-flow indication, and alarms.
- High resolution industry standard ASCII encoder protocol.

The Ultrasonic meter is available with an in-line connector for easy connection and installation to AMR/AMI endpoints. It is also available with a flying lead for field splice connection.

APPLICATIONS

Use the Ultrasonic meter for measuring potable cold water in residential, commercial and industrial services. The meter is also ideal for non-potable, reclaimed irrigation water applications or less than optimum water conditions where small particles exist.

E-Series Ultrasonic meters meet and exceed ANSI/AWWA C715 standards. The meters comply with the lead-free provisions of the Safe Drinking Water Act, are certified to NSF/ANSI Standards 61 and 372 and carry the NSF-61 mark on the housing.

OPERATION & PERFORMANCE

As water flows into the measuring tube, ultrasonic signals are sent consecutively in forward and reverse directions of flow. Velocity is then determined by measuring the time difference between the measurement in the forward and reverse directions. Total volume is calculated from the measured flow velocity using water temperature and pipe diameter. The LCD display shows total volume and alarm conditions and can toggle to display rate of flow.

In the normal temperature range of 45…122° F (7…50° C), the Ultrasonic "new meter" consumption measurement is accurate to:

- ±1.5% over the normal flow range
- ±3.0% from the extended low flow range to the minimum flow value

CONSTRUCTION

E-Series Ultrasonic meters feature a stainless steel, lead-free meter housing, an engineered polymer and stainless steel metering insert, a meter-control circuit board with associated wiring, LCD, and battery. Wetted elements are limited to the pressure vessel, the polymer/stainless steel metering insert and the transducers. The electronic components are housed and fully potted within a molded, engineered polymer enclosure, which is permanently attached to the meter housing. The transducers extend through the stainless steel housing and are sealed by O-rings.

The metering insert holds the stainless steel ultrasonic reflectors in the center of the flow area, enabling turbulence-free water flow through the tube and around the ultrasonic signal reflectors. The metering insert's patented design virtually eliminates chemical buildup on the reflectors, ensuring long-term metering accuracy.

METER INSTALLATION

The meter is completely submersible and can be installed using horizontal or vertical piping, with flow in the up direction. The meter will not measure flow when an "empty pipe" condition is experienced. An empty pipe is defined as a condition that occurs when the flow sensors are not fully submerged.

SPECIFICATIONS

E-Series Ultrasonic Meter Size	1-1/2 in. (40 mm)	2 in. (50 mm)
Normal Test Flow Limits	1.25…100 gpm (0.28…22.7 m^3/hr)	1.5…160 gpm (0.34…36.3 m^3/hr)
Minimum Test Flow Limits	0.40 gpm (0.09 m^3/hr)	0.50 gpm (0.11 m^3/hr)
Safe Maximum Operating Condition (SMOC)	100 gpm (22.7 m^3/hr)	160 gpm (36.3 m^3/hr)
Typical Pressure Loss	3.8 psi (0.26 bar)	5.2 psi (0.36 bar)
Reverse Flow – Maximum Rate	12 gpm (2.73 m^3/hr)	18 gpm (4.09 m^3/hr)
Operating Performance	In the normal temperature range of 45…122° F (7…50° C), new meter consumption measurement is accurate to: • ±1.5% over the normal flow range • ±3.0% from the extended low flow range to the minimum flow value	
Storage Temperature	– 40…140° F (– 40…60° C)	
Maximum Ambient Storage (Storage for One Hour)	150° F (66° C)	
Measured-Fluid Temperature Range	34…140° F (1…60° C)	
Humidity	0…100% condensing; meter is capable of operating in fully submerged environments	
Maximum Operating Pressure of Meter Housing	175 psi (12 bar)	
Register Type	Straight reading, permanently sealed electronic LCD; digits are 0.28 in. (7 mm) high	
Register Display	• Consumption (up to nine digits) • Rate of flow • Alarms • Unit of measure factory programmed for gallons, cubic feet and cubic meters	
Register Capacity	• 100,000,000 gallons • 10,000,000 cubic feet • 1,000,000 cubic meters	
Totalization Display Resolution	• Gallons: 0.X • Cubic feet: 0.XX • Cubic meters: 0.XXX	
Battery	3.6-volt lithium thionyl chloride; battery is fully encapsulated within the register housing and is not replaceable; 20-year battery life	

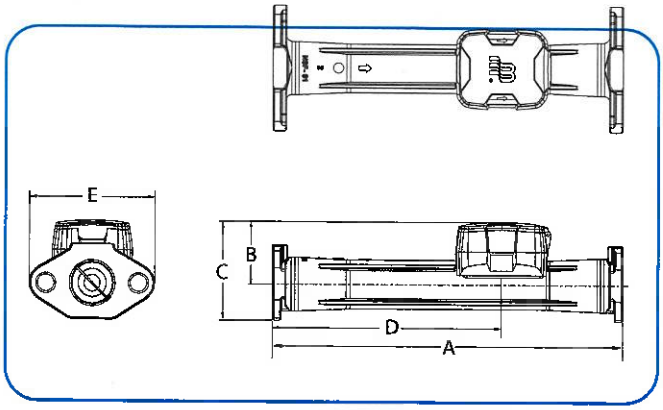
MATERIALS

Meter Housing	316 stainless steel
Measuring Element	Pair of ultrasonic sensors located in the flow tube
Register Housing & Lid	Engineered polymer
Metering Insert	Engineered polymer & stainless steel
Transducers	Piezo-ceramic device with wetted surface of stainless CrNiMo

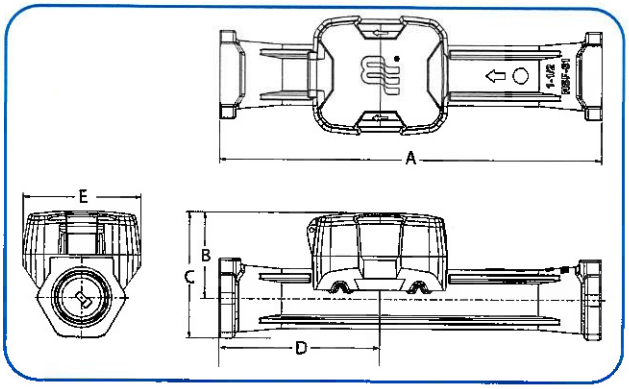
PHYSICAL DIMENSIONS

E-Series Ultrasonic Meter Size	1-1/2 in. (40 mm)	1-1/2 in. (40 mm)	2 in. (50 mm)	2 in. (50 mm)
Housing	**Elliptical**	**HEX**	**Elliptical**	**HEX**
Size Designation X Lay Length	1-1/2 x 13 in. (38 x 330 mm)	1-1/2 x 12.62 in. (38 x 321 mm)	2 x 17 in. (51 x 432 mm)	2 x 15.25 in. (51 x 387 mm)
Weight (without AMR)	8.2 lb (3.7 kg)	6.5 lb (2.9 kg)	11.9 lb (5.4 kg)	8.9 lb (4.0 kg)
See illustration below for Measurement Designations.				
Length (A)	13 in. (330 mm)	12.62 in. (321 mm)	17 in. (432 mm)	15.25 in. (387 mm)
Height (B)	2.80 in. (71 mm)	2.84 in. (72 mm)	3.01 in. (77 mm)	3.06 in. (78 mm)
Height (C)	4.55 in. (116 mm)	4.15 in. (105 mm)	4.76 in. (121 mm)	4.68 in. (119 mm)
Length (D)	7.10 in. (180 mm)	5.31 in. (135 mm)	11.10 in. (282 mm)	5.05 in. (128 mm)
Width (E)	5.50 in. (140 mm)	3.90 in. (99 mm)	6.08 in. (154 mm)	3.90 in. (99 mm)
Bore Size	1-1/2 in. (40 mm)	1-1/2 in. (40 mm)	2 in. (51 mm)	2 in. (51 mm)
Two-Bolt Elliptical Flange (AWWA)	1-1/2 in. (40 mm)	—	2 in. (51 mm)	—
Bolt Hole Diameter	0.69 in. (17.53 mm)	—	0.81 in. (20.57 mm)	—
Companion Flange	1-1/2 in. (40 mm)	—	2 in. (51 mm)	—
Internal Thread Size	—	1-1/2 in. NPT	—	2 in. NPT

Elliptical Measurement Designations

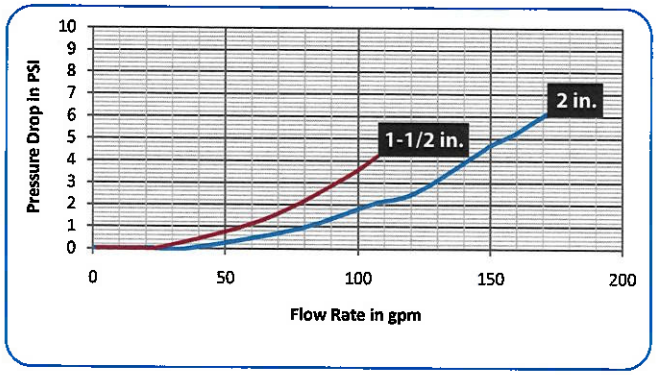


HEX Measurement Designations



PRESSURE LOSS CHART

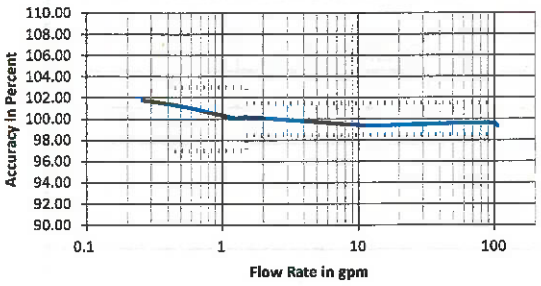
Flow rate in Gallons Per Minute (gpm)



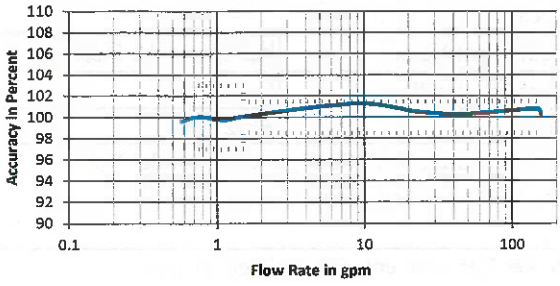
ACCURACY CHARTS

Rate of Flow in gallons per minute (gpm)

1-1/2 in. Meter



2 in. Meter



***SMART WATER IS** BADGER METER*

EQUIPMENT DATA SHEET			
Client:	New York State Office of General Services		
Project:	Wallkill Rest Area Tank Replacement - 061658		
Location(s):	NYS I-84		
Equipment Name:	Hydropneumatic Diaphragm Tank	Quantity:	1
Material Handled:	Potable Water		
Size	45.2 gallons		
Manufacturer; Size; Configuration; Model No.: Goulds, 45.2 gallons, Vertical, model #V140			
Power Requirements (hp, voltage, phase): N/A			
Drive (constant/variable speed, direct/belt): N/A			
Speed, RPM:	N/A		
Support Utilities Required (seal water, drain, compressed air): Pressure Release			
Equipment Weight (lbs):	64 (shipping weight)		
Noise Level (decibals):	N/A		
Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount): Concrete Housing Pad			
Miscellanous Information Requirements:			
Attachment Checklist:	Design Calculations (on CHA Calc Paper)		X
	Manufacturer Data, Catalog Cut Sheets, Etc.		X
	Manufacturer Equipment Cost Quotation		X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	4/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:

TECHNICAL BROCHURE
BHYDRO R4

DIAPHRAGM TANKS

HYDROPRO® WATER SYSTEM TANK

GOULDS WATER TECHNOLOGY
a xylem brand

FEATURES

Horizontal Models: Feature a universal jet pump bracket and two (2) bolt-on, corrosion-resistant, high density polypropylene feet for installations with limited headspace, such as under mobile homes.

Deep Drawn Steel Shells: Provide maximum material strength.

Inner Shell: Prevents diaphragm from over-expanding.

Heavy Duty Parabolic Diaphragm: this new diaphragm design has improved diaphragm life by reducing abrasive wear. The diaphragm separates air and water to maintain the tank's air charge. The Butyl rubber diaphragm is an FDA approved material and also meets NSF / ANSI 61 - G standards.

Interior Tank Lining:

- Stand models and V45P feature durable polypropylene liner. Meets FDA requirements.
- Mounted pump models and V6P, V15P, V25P and V25H feature fusion bonded polymeric lining. Meets FDA requirements.

Maximum Working Pressure: 125 psi (except mounted pump models, 100 psi).

Temperature Rating: Maximum 120° F

Stainless Steel System Connection: On all Stand, In-Line, Buried and Horizontal models. Excludes the V6P, V15P and V25P, which are powder coated.

Appliance Appearance Exterior Finish: Blue color, high durability exterior finish of tough, powder coat over a zinc phosphate surface treatment.

Tanks are designed for installation indoors or where they are protected from rain, irrigation overspray, salt air and other corrosive environ-ments. Always protect tanks from freezing.

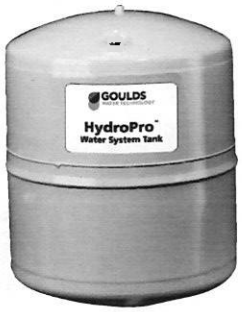
Heavy Duty Base: Made of high density polypropylene on stand models only.

Pre-charge: All tanks charged to 38 PSI.

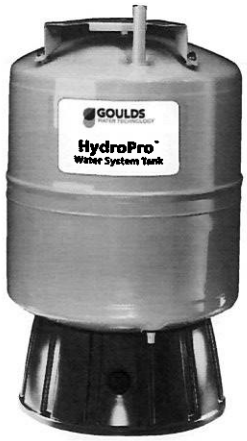
NSF Certified to NSF/ANSI 61-G

Stand Models
V45 V140
V60 V200
V80 V250
V100 V260
V100S V350

Horizontal Models with Pump Mounting
V25H V45H V60H



In-Line Models
V6P V15P
V25P V45P



Mounted Pump Models
V60MP V60PST
V45MP V45PST

Stand Model with Base Extension
V80EX

Models	Model No.	Total Volume (Gals.)	Drawdown in Gallons at System Operating Pressure Range of			Maximum Drawdown Vol. (Gals.)	Pre-Charge PSI	System Connection	Dimensions		Shipping Weight	Height From Floor to Center of Base Opening
			20/40 PSIG	30/50 PSIG	40/60 PSIG				Diameter	Height		
Stand Models	V45	13.9	5.1	4.3	3.7	8.4	38	1" NPTF	15 3/8	24 15/16	23	3 1/8
	V60	19.9	7.3	6.1	5.3	12.1	38	1" NPTF	15 3/8	32 3/8	34	
	V80	25.9	8.9	7.7	6.7	13.9	38	1" NPTF	15 3/8	39 7/16	43	
	V80EX	25.9	8.9	7.7	6.7	13.9	38	1" NPTF	15 3/8	42 5/8	43	7 1/4
	V100	31.8	11.8	9.9	8.6	13.8	38	1" NPTF	15 3/8	47 1/4	52	3 1/8
	V100S	31.8	11.8	9.9	8.6	13.8	38	1" NPTF	22	28	56	
	V140	45.2	16.5	13.9	12.1	27.3	38	1¼" NPTF	22	36 7/16	64	3 3/8
	V200	65.1	23.9	20.0	17.4	39.3	38	1¼" NPTF	22	48 5/8	89	
	V250	83.5	30.9	25.9	22.5	50.8	38	1¼" NPTF	26	46	116	3 1/2
	V260	84.9	31.2	26.2	22.8	44.7	38	1¼" NPTF	22	60 1/16	113	3 3/8
	V350	115.9	42.9	35.9	31.3	70.5	38	1¼" NPTF	26	61 5/16	161	3 1/2
Mounted Pump Models*	V45MP	13.9	5.1	4.3	3.7	8.4	38	¾" Pipe	15 3/8	25 1/16	28	
	V60MP	19.9	7.3	6.1	5.3	12.1	38	¾" Pipe	15 3/8	33 1/8	40	
	V45PST	13.9	5.1	4.3	3.7	8.4	38	¾" Pipe	15 3/8	25 1/16	28	
	V60PST	19.9	7.3	6.1	5.3	12.1	38	¾" Pipe	15 3/8	33 1/8	40	
Buried Models	V60B	19.9	7.3	6.1	5.3	12.1	38	1" NPTM	15 3/8	28 1/2	33	
	V140B	45.2	16.5	13.9	12.1	27.3	38	1¼" NPTM	22	32 3/16	63	
In-Line ① Models	V6P	1.9	0.7	0.6	0.5	1.3	38	¾" NPTM	8¼	10 3/16	7	
	V15P	4.9	1.8	1.5	1.4	3.1	38	¾" NPTM	11	14 ¾	11	
	V25P	7.3	2.7	2.3	2.1	3.1	38	¾" NPTM	11	21 1/16	16	
	V45P	13.9	5.1	4.3	3.7	8.4	38	1" NPTM	15 3/8	21 1/16	24	
Horizontal Models w/Bracket	V25H ①	7.3	2.7	2.3	2.1	3.1	38	¾" NPTM	11	21 1/16	20	
	V45H	13.9	5.1	4.3	3.7	8.4	38	1" NPTM	15 3/8	22 7/16	26	
	V60H	19.9	7.3	6.1	5.3	12.1	38	1" NPTF	15 3/8	33 7/8	36	

NOTES:

* Compatible with only certain Goulds jet pumps.

P = Pipe mounted
MP = Mounted pump
EX = With base extension
PST = Pump system tank
B = Buried
H = Horizontal with bracket

(All dimensions are in inches and weight in lbs. Do not use for construction purposes.)

① V6P, V15P, V25P and V25H are produced at Charlotte, NC plant after January 2013, resulting in minor dimensional changes.

ACCESSORIES

AW39 Bracket:
Universal pump mounting bracket for use on all stand model tanks.

AWT1 Base Extension:
For use on 15⅜" models. Provides 4⅛" base elevation. Supplied in quantities of six (6) per carton.

Order No.	Description	Wt. (lbs.)
AW39	Universal Jet Pump Bracket	2
AWT1	Tank Base Extension (Qty. 6)	5

EQUIPMENT DATA SHEET			
Client:	New York State Office of General Services		
Project:	Wallkill Rest Area Tank Replacement - 064396		
Location(s):	NYS I-84		
Equipment Name:	Inline Draining Ball Valve	Quantity:	1
Material Handled:	Well Water		
Size	1.5"		
Manufacturer; Size; Configuration; Model No.: Mueller, 1.5", Horizontal, V25225N			
Power Requirements (hp, voltage, phase): N/A			
Drive (constant/variable speed, direct/belt): N/A			
Speed, RPM:	N/A		
Support Utilities Required (seal water, drain, compressed air):			
Equipment Weight (lbs):	5		
Noise Level (decibals):	N/A		
Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):			
Miscellanous Information Requirements:			
Attachment Checklist:	Design Calculations (on CHA Calc Paper)		X
	Manufacturer Data, Catalog Cut Sheets, Etc.		X
	Manufacturer Equipment Cost Quotation		X

Quality Assurance/Quality Control Tracking			
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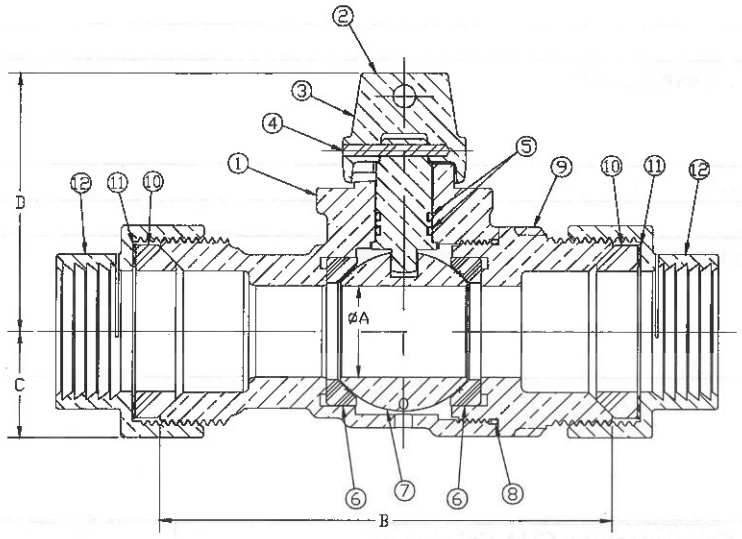
Revision Tracking			
Date	Description	Revised by:	Approved by:



No.	DESCRIPTION	MATERIAL
1	BODY	CAST NO LEAD BRASS ALLOY
2	CAP	CAST BRASS ASTM B62 ALLOY C83600
3	STEM	NO LEAD BRASS ALLOY
4	ROLL PIN	STAINLESS STEEL
5	O-RING	EPDM ASTM D2000
6	GASKET - SEAL	TEFLON
7	BALL	NO LEAD BRASS ALLOY
8	O-RING	EPDM ASTM D2000
9	END PIECE	CAST NO LEAD BRASS ALLOY
10	PJ GASKET	ASTM D2000 (BUNA N)
11	PJ WASHER	POLYPROPYLENE
12	PJ CPLG NUT	CAST BRASS ASTM B62 ALLOY C83600

SIZE	ØA	B	C	D
1"	1.00	4.92	1.16	2.84
1-1/2"	1.50	5.50	1.66	3.46
2"	2.00	6.59	1.82	3.78

ALL WETTED PARTS ARE NO LEAD BRASS ALLOY

FILEPATH: PROD-ENG\MUELLER\ASYSUBMITTALS\V25225N

REV	ECR	DESCRIPTION	DATE	BY	CHKR

PER EST NO: DXXXX EST FIN WT = 0.00000 lbs

DRFTR	RWB	5/12/20
CHKR		
ENGR		
MGR		
	BY	DATE

STK No:

MAT'L:

DESCR. INLINE NLB DRAINING BALL VALVE
IPS PVC-PJ x IPS PVC-PJ

MUELLER

UNLESS OTHERWISE NOTED
SURFACE PREPARATION:
BREAK CORNER(S) ----- .000
SURFACE FINISH -- XX RMS
TOLERANCE(S):
LINEAR ---------- ± .000
ANGULAR ---------- ± 0°00'

THIRD ANGLE PROJECTION

REF. No.

SCALE FULL

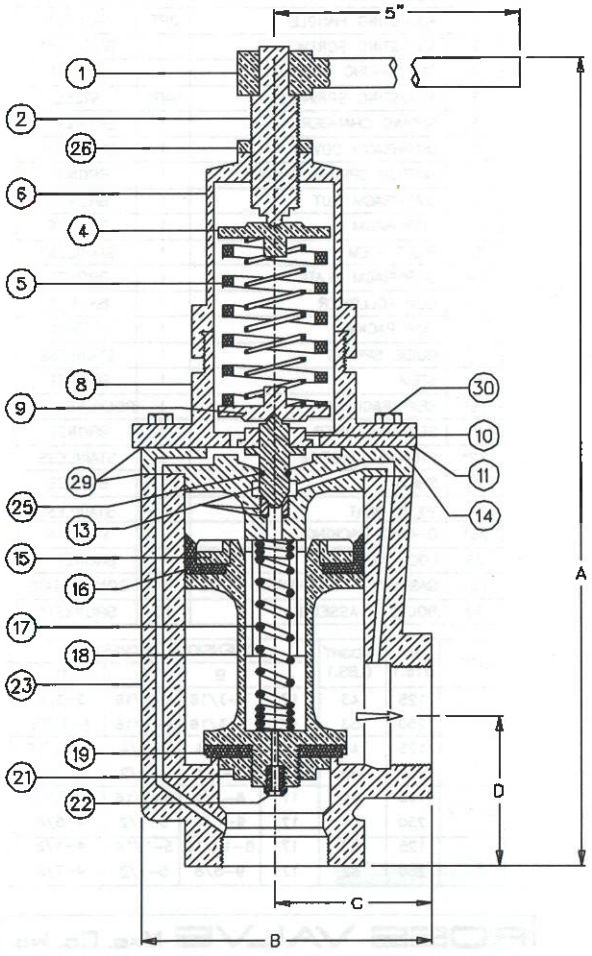
DWG NUMBER V25225N

DWG NUMBER V25225N

EQUIPMENT DATA SHEET			
Client:	New York State Office of General Services		
Project:	Wallkill Rest Area Tank Replacement - 064396		
Location(s):	NYS I-84		
Equipment Name:	Internal Pilot Operated Pressure Relief Valve	Quantity:	2
Material Handled:	Well Water and Potable Water		
Size	1"		
Manufacturer; Size; Configuration; Model No.: Ross Valve, 3" & 1", Horizontal, 20WR			
Power Requirements (hp, voltage, phase): N/A			
Drive (constant/variable speed, direct/belt): N/A			
Speed, RPM:	N/A		
Support Utilities Required (seal water, drain, compressed air):			
Equipment Weight (lbs):	3" is 62 lbs, 1" is 27 lbs		
Noise Level (decibals):	N/A		
Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):			
Miscellanous Information Requirements:			
Attachment Checklist:	Design Calculations (on CHA Calc Paper)		X
	Manufacturer Data, Catalog Cut Sheets, Etc.		X
	Manufacturer Equipment Cost Quotation		X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	7/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:



PART	DESCRIPTION	QTY	MATERIAL
1	ADJUSTING HANDLE	OPT.	BRONZE**
2	ADJUSTING SCREW	1	BRONZE**
4	TOP SPRING WASHER	1	BRONZE
5	ADJUSTING SPRING(S)	VARY	STEEL
6	SPRING CHAMBER	1	BRONZE**
8	DIAPHRAGM COVER	1	BRONZE**
9	BOTTOM SPRING WASHER	1	BRONZE
10	DIAPHRAGM NUT	1	BRONZE
11*	DIAPHRAGM	1	BRONZE
13	PILOT STEM/SEAT/O-RING	1 SET	420SS/BUNA-N
14	DIAPHRAGM PLATE	1	BRONZE
15	CUP FOLLOWER	1	BRONZE
16*	CUP PACKING	1	LEATHER
17	GUIDE SPRING	1	STAINLESS
18	STEM	1	BRONZE
19*	SEAT PACKING	1	POLYURETHANE
21	SEAT FOLLOWER	1	BRONZE
22*	STRAINER/ORIFICE	1	STAINLESS
23	SHELL	1	BRONZE
25*	O-RING PACKING	1	BUNA-N
26	LOCK NUT	1	BRONZE**
29*	GASKETS - DIAPHRAGM PLATE	2	COMPOSITION
30	BOLTS - ASSEMBLY	10	BRONZE**

* INCLUDED IN STANDARD REPAIR KIT
** OPTION - CHROME PLATED

SIZE		WEIGHT (LBS.)	DIMENSIONS (INCHES)			
			A	B	C	D
1, 1-1/4, 1-1/2	S.B.	27	14	5-1/8	2-1/2	2-3/4
1-1/2, 2	L.B.	34	16	5-1/2	2-7/8	2-3/4
2-1/2, 3	L.B.	43	17	7-3/4	5-1/4	4-3/8

S.B. - SMALL BODY
L.B. - LARGE BODY

DIAPHRAGM PLATE #14 ALIGN THROUGH HOLE IN PLATE WITH INTERNAL WASTE PORT ON OUTLET SIDE OF SHELL.

GASKET PLACEMENT

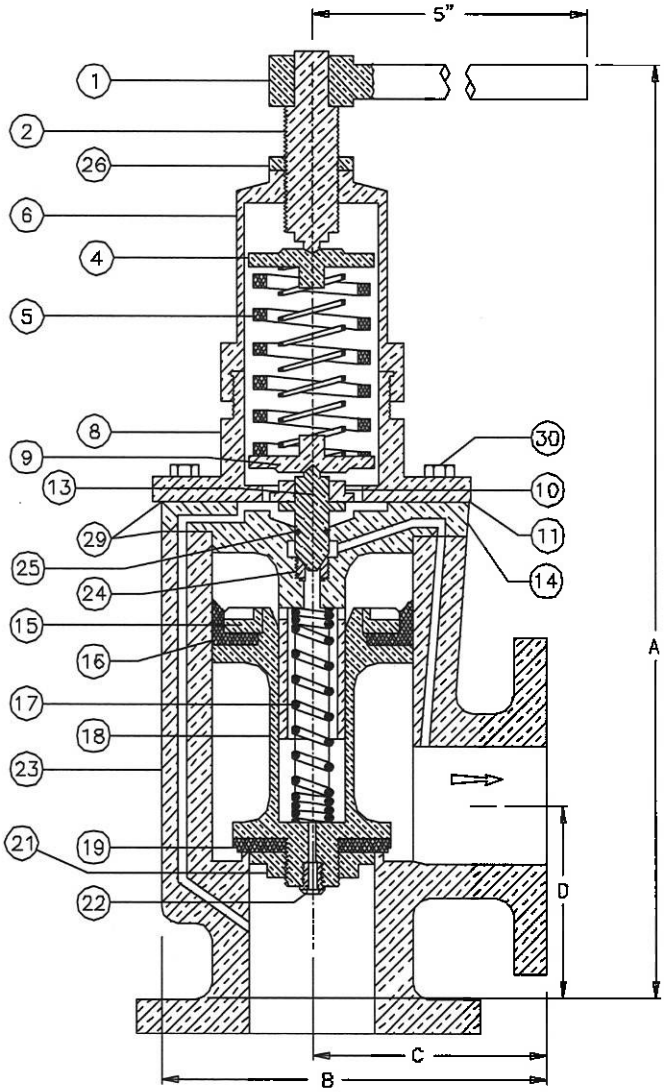
- PLACE (1) #29 GASKET ON TOP OF #14 DIAPHRAGM PLATE (BELOW #11 DIAPHRAM) - ALL BOLT HOLES SHOULD BE OPEN, WHILE THE PORT HOLE SHOULD BE COVERED.
- PLACE (1) #29 GASKET BELOW #14 DIAPHRAGM PLATE - ALL BOLT HOLES AND PORT HOLES SHOULD BE OPEN.

ROSS VALVE Mfg. Co., Inc.
6 OAKWOOD AVENUE - P.O. BOX 585 - TROY, NEW YORK, 12181 - TEL. (518) 274 0981

NO SCALE		DRAWING	20WR-STEL
DATE 4-6-51	3401-AA	REVISED	8-25-99 DMB

MODEL 20WR ANGLE BODY
SURGE RELIEF VALVE WITH NPT
END CONNECTIONS & STELLITE SEAT INSERT

FILE: 20WRSTEL



* INCLUDED IN STANDARD REPAIR KIT

** OPTION CHROME PLATED

PART	DESCRIPTION	QTY	MATERIAL
1	ADJUSTING HANDLE	OPT.	BRONZE**
2	ADJUSTING SCREW	1	BRONZE**
4	TOP SPRING WASHER	1	BRONZE
5	ADJUSTING SPRING(S)	VARY	STEEL
6	SPRING CHAMBER	1	BRONZE**
8	DIAPHRAGM COVER	1	BRONZE**
9	BOTTOM SPRING WASHER	1	BRONZE
10	DIAPHRAGM NUT	1	BRONZE
11*	DIAPHRAGM	1	BRONZE
13	PILOT STEM	1	STAINLESS
14	DIAPHRAGM PLATE	1	BRONZE
15	CUP FOLLOWER	1	BRONZE
16*	CUP PACKING	1	LEATHER
17	GUIDE SPRING	1	STAINLESS
18	STEM	1	BRONZE
19*	SEAT PACKING	1	POLYURETHANE
21	SEAT FOLLOWER	1	BRONZE
22*	STRAINER/ORIFICE	1	STAINLESS
23	SHELL	1	BRONZE
24	PILOT SEAT	1	STAINLESS
25*	O-RING PACKING	1	BUNA-N
26	LOCK NUT	1	BRONZE**
29*	GASKETS - DIAPHRAGM PLATE	2	COMPOSITION
30	BOLTS - ASSEMBLY	10	BRONZE**

SIZE	ANSI B16.1	WEIGHT (LBS.)	DIMENSIONS (INCHES)			
			A	B	C	D
1-1/2	125	43	17	7-3/16	4-3/16	3-3/4
	250	53	17	7-3/16	4-7/16	4-1/16
2	125	43	17	7-1/4	4-1/4	3-13/16
	250	53	17	7-3/4	4-1/2	4-1/8
2-1/2	125	54	17	8-3/4	5-3/16	4-5/16
	250	64	17	9-1/4	5-1/2	4-5/8
3	125	52	17	8-13/16	5-1/16	4-1/2
	250	62	17	9-5/8	5-1/2	4-7/8

ROSS VALVE Mfg. Co. Inc.

6 OAKWOOD AVENUE - P.O. BOX 558 - TROY, NEW YORK, 12181 - TEL. (518) 274 0951

NO SCALE		DRAWING	20WR-F-SS
DATE	4-6-51 3401-AA	REVISED	6-14-02 TJS

MODEL 20WR-F ANGLE BODY
SURGE RELIEF VALVE WITH
INTERNAL STAINLESS STEEL PILOT SET & FLANGES,

FILE: 20WR-FSTEL

EQUIPMENT DATA SHEET

Client:	New York State Office of General Services
Project:	Wallkill Rest Area Tank Replacement - 064396
Location(s):	NYS I-84

Equipment Name:	PVC True Union Ball Valve	Quantity:	3
Material Handled:	Well Water		
Size	1.25" & 3"		

Manufacturer; Size; Configuration; Model No.:
Flui-Pro, 1.25" & 3", Horizontal, Series 2

Power Requirements (hp, voltage, phase):
N/A

Drive (constant/variable speed, direct/belt):
N/A

Speed, RPM:	N/A

Support Utilities Required (seal water, drain, compressed air):

Equipment Weight (lbs):	0.5
Noise Level (decibals):	N/A

Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):

Miscellanous Information Requirements:

Attachment Checklist:	Design Calculations (on CHA Calc Paper)	X
	Manufacturer Data, Catalog Cut Sheets, Etc.	X
	Manufacturer Equipment Cost Quotation	X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	7/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:

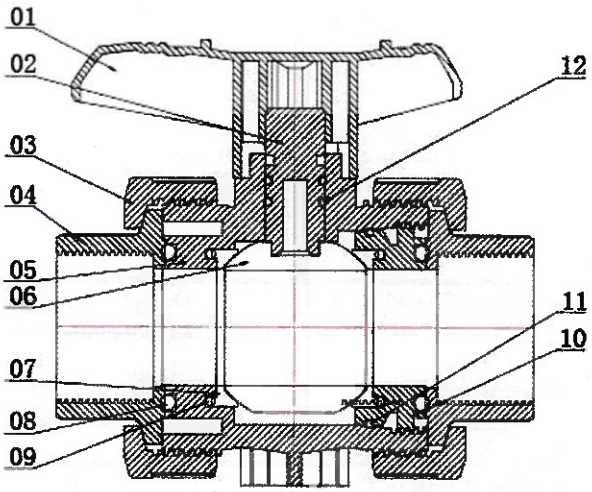
SERIES 2 – True Union Ball Valve

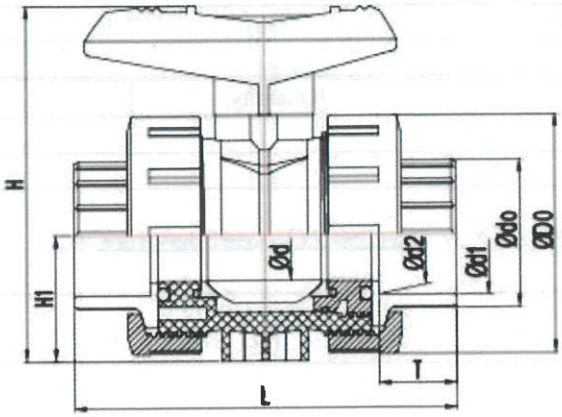
Flui-PRO VALVES

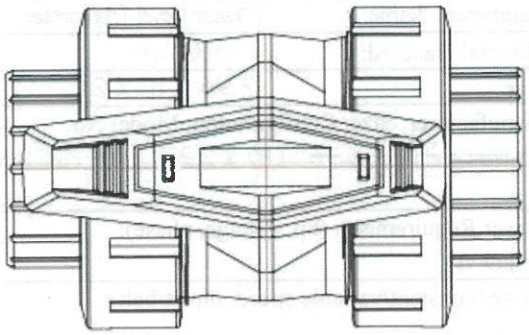
- ✓ Top Quality Industrial Style Valve
- ✓ Removable Double Union Design
- ✓ Durable PVC Construction
- ✓ TPE Seats, EPDM Seals
- ✓ Socket & Threaded Ends Included up to 2" Size
- ✓ Available in ½" – 4" Sizes

Materials:

1. Lever – PVC
2. Shaft – PVC
3. Nut (2) – PVC
4. Threaded Faucet (2) – PVC
5. Body – PVC
6. Ball – PVC
7. Ball Seat (2) – TPE
8. O-Ring1 (2) – EPDM
9. O-Ring2 (2) – EPDM
10. Seal-Carrier – PVC
11. O-Ring3 – EPDM
12. O-Ring4 (2)- EPDM







Dimensions in Inches									
Size	D0	d0	d1	d2	d	H1	H	T	L
1/2"	2.03	1.08	0.85	0.84	0.61	1.04	3.26	0.91	4.25
3/4"	2.32	1.29	1.06	1.05	0.81	1.20	3.65	1.04	4.84
1"	2.76	1.63	1.33	1.31	1.02	1.54	4.30	1.16	5.34
1-1/4"	3.36	1.95	1.67	1.66	1.30	1.74	5.19	1.29	6.25
1-1/2"	3.89	2.37	1.91	1.89	1.54	2.06	5.64	1.26	6.57
2"	4.81	2.99	2.39	2.37	2.01	2.81	6.92	1.54	7.20
2-1/2"	6.24	3.53	2.89	2.87	2.52	3.26	9.11	1.75	9.29
3"	7.56	4.15	3.52	3.49	3.19	3.91	10.26	1.91	9.80
4"	8.80	5.06	4.52	4.49	3.90	4.54	11.50	2.29	11.38

Please Note: The 2-1/2", 3", and 4" size handle is different than pictured in drawing above. If the handle dimensions are critical to your application, please contact us for detailed information.

EQUIPMENT DATA SHEET			
Client:	New York State Office of General Services		
Project:	Wallkill Rest Area Tank Replacement - 061658		
Location(s):	NYS I-84		
Equipment Name:	Water Level Transmitter	Quantity:	1
Material Handled:	Potable Water		
Size	6.96" (H) X 2.92" (W)		

Manufacturer; Size; Configuration; Model No.:
Flowline Level Best, 6.96" (H) X 2.92" (W), Push button of WebCal PC windows USB 2.0, model EchoPod UG06

Power Requirements (hp, voltage, phase):
14-28 VDC

Drive (constant/variable speed, direct/belt):
N/A

Speed, RPM: N/A

Support Utilities Required (seal water, drain, compressed air):
Water tight seal, enclosure vent, mount gasket

Equipment Weight (lbs):	10
Noise Level (decibals):	N/A

Equipment Support Requirements (Housekeeping/Isolation Pad; Wall/Floor Mount):
Mount gasket. Creates water tight seal with tank.

Miscellanous Information Requirements:
Conduit entrance is 1/2" NPT

Attachment Checklist:		
	Design Calculations (on CHA Calc Paper)	X
	Manufacturer Data, Catalog Cut Sheets, Etc.	X
	Manufacturer Equipment Cost Quotation	X

Quality Assurance/Quality Control Tracking			
Prepared by (AE or PE):	KSM	Date:	4/28/2020
Checked by (PE or PM):	ETH	Date:	
Approved by (QA/QC):	ETH	Date:	

Revision Tracking			
Date	Description	Revised by:	Approved by:

EchoPod® UG06 & UG12

Reflective Ultrasonic Liquid Level Transmitter

FLOWLINE
LEVEL BEST

Application

The general purpose reflective ultrasonic level transmitter provides continuous level measurement up to 39.3' (12m) with a 4-20 mA analog signal output, and is configured via its integral push button display module or WebCal software. The non-contact liquid level sensor features our proprietary Reflective Technology™ that delivers reliable level measurement in condensing environments. Select this sensor for bulk tanks with non-foaming or mildly vaporous media such as chemicals, water, wastewater and oil. Typical applications include bulk storage, neutralization tank, clarifier and waste sumps.

UG12 Shown

UG06 Shown

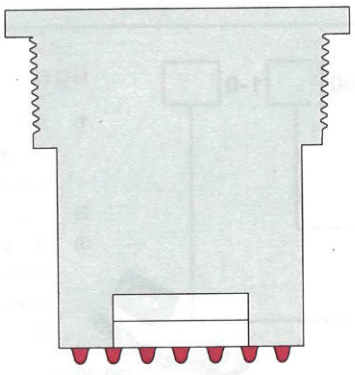
Features

- Offered in 6m (19.6') and 12m (39.3') measurement ranges
- Reflective Technology™ measures reliably with condensation
- Corrosion resistant PVDF transducer with IP68 PP enclosure
- Fail-safe diagnostics with selectable signal fail-safe outputs
- LCD display indicates level in inches, meters or percent of span
- Narrow 3" (7.6cm) beam width for applications with limited space
- Windowed enclosure cap provides liquid tight level indication
- Configuration via push button display or WebCal software
- Automatic temperature compensation from -40° to 80° C.

Reflective Technology™

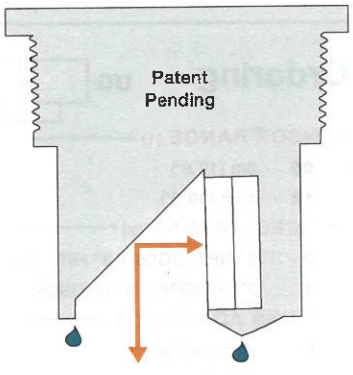
Condensation is the most common variable in liquid level applications. Condensation attenuates the acoustic signal of ultrasonic sensors with horizontal transducers, weakening their signal strength and signal to noise ratio by up to 50%, and substantially reducing their measurement reliability. At the core of Reflective Technology™ is a simple fact. Unlike flat horizontal surfaces, significant water droplets cannot adhere to smooth vertical surfaces. By orienting the transducer vertically, condensation runs off the transducer and does not affect sensor performance. The unimpeded transmit and receive signals are redirected to and from the liquid off a 45° reflector, delivering reliable level measurement. Thanks gravity.

Horizontal Transducer



Signal Attenuation

Reflective Transducer



Reliable Measurement

 | 10500 Humbolt Street, Los Alamitos, CA 90720 USA p 562.598.3015 f 562.431.8507 w flowline.com

EchoPod® UG06 & UG12

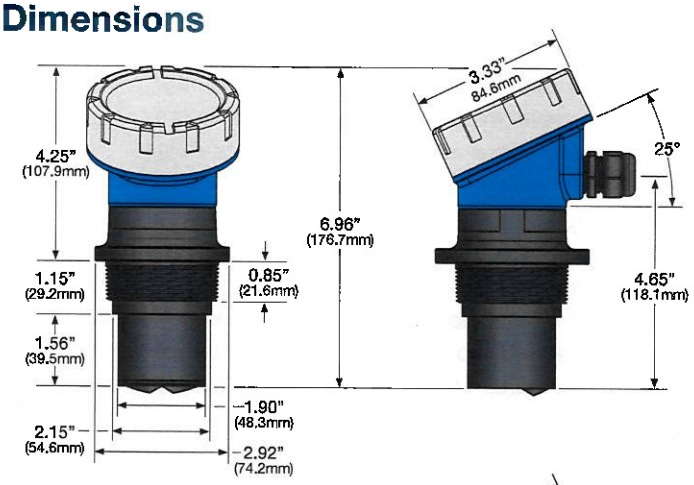
Reflective Ultrasonic Liquid Level Transmitter

FLOWLINE™ LEVEL BEST

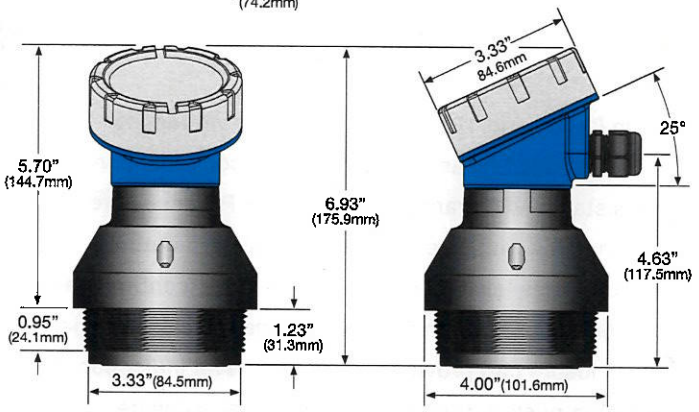
Specifications

Range:	UG06: 8" to 19.6' (20cm to 6m) UG12: 18" to 39.3' (45.7cm to 12m)
Accuracy:	± 0.2% of range
Resolution:	UG06: 0.079" (2mm) UG12: 0.196" (5mm)
Dead band:	UG06: 8" (20.3cm) UG12: 18" (45.7cm)
Beam width:	UG06: 3" (7.6cm) UG12: 6" (15.2cm)
Configuration:	Push button or WebCal® PC Windows® USB® 2.0
Memory:	Non-volatile
Display type:	LCD, 6-digit
Display units:	Inch, cm or percent
Supply voltage:	14-28 VDC
Max. consumption:	0.5W
Loop resistance:	500 ohms @ 24 VDC
Signal output:	4-20mA, two-wire
Signal invert:	4-20mA or 20-4mA
Signal fail-safe:	4mA, 20mA, 21mA, 22mA, hold last
Process temp.:	F: -40° to 176° C: -40° to 80°
Temp. comp.:	Automatic
Ambient temp.:	F: -31° to 140° C: -35° to 60°
Pressure:	30 psi (2 bar)
Enclosure rating:	Type 6P (IP68)
Encl. material:	Polypropylene
Encl. cap material:	Clear polycarbonate
Enclosure vent:	Water tight membrane
Conduit entrance:	1/2" NPT
Transducer type:	Reflective
Transducer mat.:	Polyvinylidene fluoride
Process mount:	06-0001: 2" NPT 06-0011: 2" G 12-0001: 3" NPT 12-0011: 3" G
Mount gasket:	-0001: N/a -0011: Viton®
Classification:	General purpose
Approval:	UL 61010-1
Compliance:	CE, RoHS

Dimensions



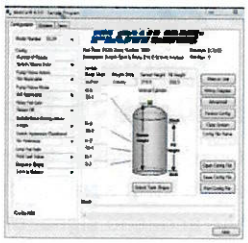
UG06 Shown



UG12 Shown

Configuration

In addition to the push button display module, the sensor may be configured via our WebCal software and one Fob USB adapter. WebCal is a PC utility program that allows users to easily configure their sensors, update firmware, save configurations and print wiring schematics prior to installation. WebCal is a free download from our website.



Ordering

UG [ ][ ]-00[ ]1-0[ ]

SENSOR RANGE (1)

- **06** 6m (19.6')
- **12** 12m (39.3')

PROCESS MOUNT (2)

- **0** 2" NPT (UG06) / 3" NPT (UG12)
- **1** 2" G (UG06) / 3" G (US06)

FOB USB ADAPTER (3)

- **0** Without Fob
- **1** With Fob

LI99-2001

NOTES

1) If you want help in selecting a sensor for your application, please go to our website and submit a Level Questionnaire. An engineer will review your requirements and suggest a product solution via email.
2) Install the sensor using Flowline installation fittings or equivalents.
3) Sensors are offered with or without a LI99-2001 Fob USB adapter. If you want to configure the sensor using our free WebCal software, you need one Fob, which can then be used with any WebCal compatible ultrasonic or guided wave sensor. WebCal is a free download from our website.

 | 10500 Humbolt Street, Los Alamitos, CA 90720 USA **p** 562.598.3015 **f** 562.431.8507 **w** flowline.com **DS310410 REV A2**

November 5, 2020

Mr. Lee Bergus
Orange County Department of Health
1887 County Building
124 Main Street
Goshen, New York 10924

RE: I-84 Wallkill Rest Area Water System Replacement
PWS ID# NY3517028
CHA Project No.: 064396

Dear Mr. Bergus:

CHA has received your comments, dated October 21, 2020, for the above referenced project. We have edited the documents accordingly. Your comments and our responses are provided below.

1. *With respect to the Engineer's correspondence to this office dated September 11, 2020:*
   a. *On page 2 of the narrative, it is stated that the proposed Goulds model V140 hydropneumatic tank has a volume of 40 gallons and will be pre-charged to 35 psi (10 psi below the initial pressure of 45 psi). The equipment cut sheets for the tank, as provided, specify a volume of 45.2 gallons with a pre-charge of 38 psi. Please review and revise for consistency.*

      CHA response: We have revised the drawings and report to reflect the volume and pre-charge that are stated on the cut sheet for consistency. Any adjustments, if necessary, will be performed during startup of the new pumps.

   b. *An Engineer's Report is required for this project. Supporting calculations, e.g. tank sizing and 4-log virus inactivation calculations, as well as the engineer's correspondence may be bound together to generate the project report.*

      CHA response: We have formatted the previous correspondence and cut sheets into a engineer's report that has been dated, stamped, and signed.

   c. *Manufacturer's catalog cut sheets and "Equipment Data Sheets" are integral components of the engineer's report and as such must be included in the report. We require that only the cut sheets for the actual equipment (model numbers) proposed be included in the report. Providing the manufacturer's technical brochures in their entirety is not acceptable, as it masks the actual equipment proposed from ready access. As an alternative, applicable cut sheets and data sheets may be included in the plan set or data may be extracted from the sheets and placed in a set of specifications. Engineer's Report or specifications must be dated, signed, and sealed by the design professional.*

      CHA response: We have deleted non-relevant pages from the cut sheets to focus on the selected equipment, as suggested, however, some content is still retained to explain the functionality of the devices for the record. As discussed above we have compiled these

III Winners Circle, P.O. Box 5269, Albany, NY 12205-0269
T 518.453.4500 • F 518.458.1735 • www.chacompanies.com

truncated data sheets into the stamped/signed engineer's report.

2. *Regarding the Plan Set dated 9/11/20:*
   a. *Project name on sheet G-001 should be revised to reflect the full scope of modifications proposed. Modifications include replacement of the failed hydropneumatic tank by a 2000-gallon atmospheric/chlorine contact tank, installation of a new pumping system, and associated improvements to the piping/chemical feed systems.*

      CHA response: As this project has already been distributed for review by the NYS Office of General Services and the NYS Department of Transportation under this project name, we have elected not to change it at this stage; however, we have added a brief scope narrative box on the cover sheet of the drawings so it is immediately clear what the project is intending to achieve.

   b. *Drawing list of sheet G-001 must be revised to reference only the sheets that are subject to review and approval by the Orange County Department of Health (OCDOH). As an alternative, each sheet listed in the schedule that is not subject to this department's review may bear a note stating as such.*

      CHA response: We have indicated on the index which drawing sheets are, or are not, subject to OCDOH review, and which are included in the review package.

   c. *With respect to sheet C-101:*
      i. *The note "1/4" polyethylene tubing (in 4" PVC sleeve)" should state that (2) tubes are to be provided within the sleeve (one as spare).*

         CHA response: We have edited the drawing accordingly.

      ii. *A check valve must be installed between the smooth-nosed raw water sample tap and the chlorine injection point.*

         CHA response: A check valve has been added on sheet C-101 and C-103.

      iii. *Suction and discharge pressure gauges should be installed on the two booster pumps unless instrumentation is provided on the pump control panel. Flexible couplings should be considered on the suction/discharge piping to minimize possible damage due to excessive vibration.*

         CHA response: Suction and discharge pressure gauges (and isolation valves) have been added to each pump. The pumps are driven by variable speed motors with soft start and stops, so we do not anticipate excessive vibration in the piping.

   d. *With respect to sheet C-103:*
      i. *On the section A detail, a new ½" PVC chlorine feed line is proposed between the chemical feed pump and the contact tank. On sheet C-101, a ¼" PVC line is specified. Please review and revise for consistency. ½" tubing is only specified on the wall mounted chemical feed system after which it transitions to a ¼".*

         CHA response: We have changed the design to transition from the ½" PVC on the chemical feed skid to a ¼" tubing all the way to the injection point, and

edited the drawings for consistency to reflect this change.

ii. *On the "Water System Plan", it appears that the 2" flow meter is installed prior to the smooth-nosed sample tap. On sheet C-301 the raw water sample tap appears to precede the 2" flow meter. Please review and revise for consistency, if appropriate.*

CHA response: We have reversed the positions of the meter and sample tap on C-101 for consistency with C-103.

iii. *On Note 4, pre-charge for the Goulds bladder tank (model V140) is specified as 45 psi. Engineer's narrative (page 2) states that the pre-charge will be 35 psi (10 psi below the initial pressure of 45 psi). The equipment cut sheets specify a pre-charge of 38 psi for this model (see comment 1A above). Review and revise for consistency.*

CHA response: We have edited the note to reflect the pre-charge of 38 psi for consistency with the data sheet. Any adjustments, if necessary, will be performed during startup of the new pumps and recorded as part of record drawings.

iv. *Note 12 must clearly state that a minimum of two (2) sets of samples are to be collected twenty-four hours apart.*

CHA response: The note has been edited accordingly.

e. *On sheet C-601, please provide a note under the "Drip Edge Detail" that the detail is not subject to the review and approval of the OCDOH.*

CHA response: We have added the note as requested.

f. *A detail should be provided for the concrete housekeeping pads proposed to support the two booster pumps along with the means of properly securing the pumps to the pad. Section A detail on sheet C-103 specifies "Housekeeping Pad (TYP)", however a detail was not provided with the plan set under review.*

CHA response: A housekeeping pad detail has been added. The pumps and tank will be anchored per the equipment manufacturer's recommendations.

g. *A note should be added to the plans indicating pitch on the floor slab to allow for proper drainage.*

CHA response: The new slab has been pitched to a floor drain (which is detailed on the Structural discipline sheets, which were not subject to OCDOH review and therefore were not included. However we have added a note on C-103 indicating the slab should be pitched and to refer to the S-sheets for clarity in this review submission.

h. *If proposed, plan should depict any hose bibs to be installed at the interior/exterior of the new structure. Proper backflow prevention should be considered, e.g., vacuum breakers.*

CHA response: no new hose bibs are proposed as part of this project.

3. *A minimum of three (3) sets of revised plans and specifications must be provided with your resubmittal.*

   CHA response: Included with this correspondence are three paper copies of the drawings and three paper copies of the engineer's report (with equipment cut sheets in lieu of specifications).

4. *Upon completion of the installation, the engineer must certify to this department on the applicable NYSDOH form that the work was completed in substantial compliance with the approved plans.*

   CHA response: We will submit certification to your office upon project completion.

Should you have any additional questions, please do not hesitate to contact me directly at 518-453-8213, or at EHirschmann@chacompanies.com.

Sincerely,

Eric J. Hirschmann

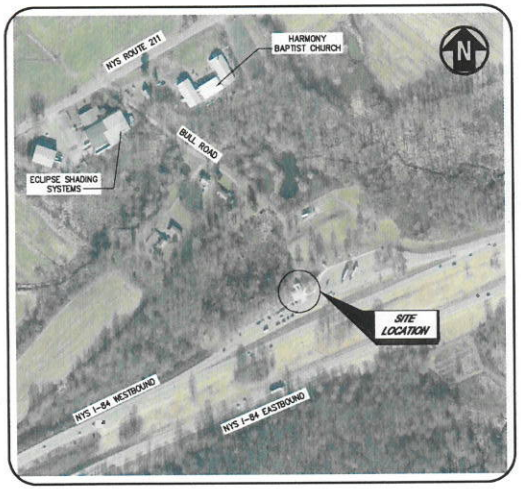
Eric Hirschmann, P.E.
Senior Engineer

CC: Michael Csenge (OGS)
Jordan Hudak (CHA)

CHA

INSTALL WATER TANK

TOWN OF WALLKILL REST AREA
MIDDLETOWN, NY
OGS PROJECT NUMBER J1405



NEW YORK STATE OF OPPORTUNITY. Department of Transportation

NEW YORK STATE OF OPPORTUNITY. Office of General Services

DESIGN & CONSTRUCTION

DRAWING LIST

G-001	TITLE SHEET	INCLUDED FOR OCDOH REVIEW
G-002	LEGEND & GENERAL NOTES	
C-101	PROCESS & INSTRUMENTATION DIAGRAM	
C-102	SITE PLAN	
C-103	BUILDING PIPING PLAN	
C-601	CIVIL, TANK, & PIPING PLAN	
S-001	NOTES, LEGENDS AND ABBREVIATIONS	NOT INCLUDED FOR OCDOH REVIEW NOT INCLUDED IN THIS DRAWING SET
S-002	TRUSS LOADING DIAGRAMS	
S-101	FOUNDATION PLAN	
S-102	ROOF FRAMING PLAN	
S-501	SECTIONS	
S-701	TYPICAL SECTIONS AND DETAILS	
S-702	TYPICAL SECTIONS AND DETAILS	
A-001	CODE COMPLIANCE	
A-101	FLOOR PLANS AND SECTIONS	
A-102	EXTERIOR DETAILS	
E-001	ELECTRICAL SPECIFICATIONS	
E-101	ELECTRICAL PLAN & DETAILS	
M-001	MECHANICAL LEGENDS AND ABBREVIATIONS	
M-101	MECHANICAL PLAN	

SCOPE NARRATIVE FOR DEPARTMENT OF HEALTH REVIEW:

PROJECT INVOLVES THE REPLACEMENT OF A FAILED, BURIED, HYDROPNEUMATIC PRESSURE TANK WITH A NEW 2,000 GALLON ABOVEGROUND CHLORINE CONTACT TANK. CHLORINE CONTACT TANK WILL BE ATMOSPHERIC. PROJECT ALSO INVOLVES MODIFICATIONS OF THE WATER SYSTEM TO INCLUDE NEW VARIABLE SPEED BOOSTER PUMPS, CHLORINE FEED SYSTEM, FLOW METER, AND ASSOCIATED PIPING, FITTINGS, VALVES, AND APPURTENANCES.

ORANGE COUNTY
DEPARTMENT OF HEALTH

REGULATORY APPROVAL SET
11/05/2020

DRAWING NUMBER: G-001

SHEET 1 OF 20

GENERAL NOTES:

1. THE BASEMAPS WERE PREPARED USING SITE PHOTOS AND AERIAL IMAGERY. SUBSURFACE STRUCTURES, ABOVE GROUND STRUCTURES AND/OR UTILITIES THAT ARE SHOWN ARE APPROXIMATE. THE EXACT LOCATIONS MAY VARY FROM THE LOCATIONS INDICATED. IN PARTICULAR, THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH PIPELINES, SUBSURFACE STRUCTURES AND/OR UTILITIES IN THE AREA MAY BE DIFFERENT FROM THAT SHOWN OR MAY NOT BE SHOWN, AND IT SHALL BE THEIR RESPONSIBILITY TO PROCEED WITH GREAT CARE IN EXECUTING ANY WORK. 48 HOURS BEFORE YOU DIG CALL DIG SAFELY NY AT 811 OR 1-(800)-962-7962 TOLL FREE.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD PRIOR TO COMMENCEMENT OF THE WORK. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL OF THE ENGINEER.
3. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONDUCT EXPLORATORY TEST PITS AS REQUIRED TO DETERMINE UNDERGROUND CONDITIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND INCURRING THE COST OF ALL REQUIRED PERMITS, INSPECTIONS, CERTIFICATES, ETC. AND SHALL COMPLY WITH ALL REQUIRED PERMITS.
5. ALL WORK SHALL BE DONE IN STRICT COMPLIANCE WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES, STANDARDS, ORDINANCES, RULES, AND REGULATIONS.
6. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS AND PERFORM ALL WORK IN ACCORDANCE WITH RECOGNIZED GOOD STANDARD PRACTICE.
7. THE ENGINEER RESERVES THE RIGHT TO EXAMINE ANY WORK DONE ON THIS PROJECT AT ANY TIME TO DETERMINE THE CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS OF THIS PROJECT, AS INTENDED AND INTERPRETED BY THE ENGINEER.
8. THE CONTRACTOR SHALL HOLD THE OWNER HARMLESS AGAINST ANY AND ALL CLAIMS ARISING FROM WORK DONE BY THE CONTRACTOR ON THE SITE.
9. MISCELLANEOUS WORK NOT SPECIFICALLY SHOWN ON THE CONTRACT DRAWINGS SUCH AS PATCHING, BLOCKING, TRIMMING, ETC., SHALL BE PERFORMED AS REQUIRED TO MAKE THE WORK COMPLETE.
10. THE CONTRACTOR SHALL PROTECT EXISTING PROPERTY LINE MONUMENTATION. ANY MONUMENTATION DISTURBED OR DESTROYED, AS JUDGED BY THE ENGINEER OR OWNER, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE UNDER THE SUPERVISION OF A NEW YORK STATE LICENSED LAND SURVEYOR.
11. ALL CONSTRUCTION STAKEOUT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
12. ALL TRENCH EXCAVATION AND ANY REQUIRED SHEETING AND SHORING SHALL BE DONE IN ACCORDANCE WITH THE LATEST REVISIONS OF NEW YORK STATE INDUSTRIAL CODE RULE 23 AND OSHA REGULATIONS FOR CONSTRUCTION. SHEET PILING SHALL BE DESIGNED AND SEALED BY A NEW YORK STATE PROFESSIONAL ENGINEER.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND THE MAINTENANCE OF SURFACE DRAINAGE DURING THE COURSE OF WORK. CONTRACTOR SHALL MAINTAIN EXISTING SITE DRAINAGE PATTERNS THROUGHOUT CONSTRUCTION UNLESS OTHERWISE SHOWN ON THE PLANS.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL WORK AND OTHER DISRUPTIONS WITH THE OWNER.
15. ALL UTILITY WORK INVOLVING CONNECTIONS TO EXISTING SYSTEMS SHALL BE COORDINATED WITH THE ENGINEER AND THE OWNER. NOTIFY THE ENGINEER AND THE OWNER 72 HOURS BEFORE EVERY CONNECTION TO EXISTING SYSTEMS IS MADE.
16. CONTRACTOR SHALL TAKE CARE TO PREVENT DAMAGE TO EXISTING UTILITIES. DAMAGED UTILITIES SHALL BE IMMEDIATELY REPAIRED BY CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
17. THE CONTRACTOR SHALL TAKE TIES TO ALL UTILITY CONNECTIONS AND PROVIDE AS-BUILT PLANS FOR ALL UTILITIES SHOWING TIES TO CONNECTIONS, BENDS, VALVES, LENGTHS OF LINES, AND INVERTS. AS-BUILT PLANS SHOWING ALL UNDERGROUND UTILITIES INSTALLED OR ENCOUNTERED SHALL BE REVIEWED BY THE OWNER AND/OR THE ENGINEER. THE CONTRACTOR SHALL PROVIDE ANY CORRECTION OR ADMISSIONS TO THE SATISFACTION OF THE OWNER AND/OR THE ENGINEER BEFORE UTILITIES WILL BE ACCEPTED.
18. TEMPORARY PAVEMENT SHALL BE PLACED WITHIN 48 HOURS OF COMPLETION OF EXCAVATION AND BACKFILL OPERATIONS WITHIN THE EXISTING PAVEMENT LIMITS.
19. ALL EXCAVATIONS SHALL BE BACKFILLED TO EXISTING GRADE AT THE END OF EACH WORK DAY.
20. THE CONTRACTOR SHALL RESTORE LAWNS, DRIVEWAYS, CULVERTS, SIGNS AND OTHER PUBLIC OR PRIVATE PROPERTY DAMAGED OR REMOVED TO AT LEAST AS GOOD A CONDITION AS BEFORE BEING DISTURBED AS DETERMINED BY THE ENGINEER. ANY DAMAGED TREES, SHRUBS, AND/OR HEDGES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

LEGEND

DESCRIPTION	EXISTING	PROPOSED
FENCE		
5' OR 10' CONTOUR LINE	250	250
1' OR 2' CONTOUR LINE	202	202
SPOT ELEVATION	120.5 OR x120.5	120.5 OR x120.5
DITCH OR SWALE		
EDGE OF STREAM OR RIVER		
LAKE OR POND		
PROPERTY LINE		
SILT FENCE		SF
GRADING LIMITS		
EDGE OF PAVEMENT		
CURB		
EDGE OF GRAVEL/DIRT ROAD		
EDGE OF WOODS		
BUILDING		
STORM SEWER	(TYPE) STORM SEWER	
SANITARY SEWER	(TYPE) SANITARY SEWER S	S
FORCE MAIN	(TYPE) FORCE MAIN FM	FM
WATER LINE	(TYPE) WATER LINE W	
MINERAL WATER	(TYPE) MINERAL WATER LINE M	M
GAS LINE	(TYPE) GAS LINE G	GAS
UNDERGROUND ELECTRIC	UNDERGROUND ELECTRIC E	UE
UNDERGROUND TELEPHONE	UNDERGROUND TELEPHONE T	UT
OVERHEAD ELECTRIC/TELEPHONE	OVERHEAD WIRES	OE
UNDERDRAIN		UD
GUIDE RAIL		
CLEANOUT		CO
END SECTION	>	OR
CATCH BASIN		
STORM MANHOLE		
HYDRANT		
WATER VALVE/CONTROL VALVE		
SANITARY SEWER MANHOLE		OR
PULL BOX		
TELEPHONE PEDESTAL		
ELECTRIC BOX		PB
LIGHT POLE, LAMP POST		
POWER POLE / UTILITY POLE		

LEGEND (CONTINUED)

DESCRIPTION	EXISTING	PROPOSED
SIGN - SINGLE FACED		OR
SIGN - DOUBLE FACED		OR
MARKER		
CONCRETE MONUMENT		
RIGHT-OF-WAY MONUMENT		
IRON ROD, PIN, OR PIPE		
BORING LOCATION	B-1	
CBR LOCATION	CBR-1	CBR
WETLAND/MARSH		
TREES, SHRUBS, BUSHES		XX-3 XX-5
DETAIL CALLOUT	X / X-X DETAIL IDENTIFICATION NO. SHEET NO. WHERE DETAIL IS SHOWN	
DETAIL IDENTIFICATION NO.	X DETAIL TITLE SCALE:	

NOTE: SOME FEATURES IN THE LEGEND MAY NOT HAVE BEEN USED

TABLE OF ABBREVIATIONS

ABS	PLASTIC PIPE	LT	LEFT
AC	ACRE	LWL	LOW WATER LEVEL
ALT	ALTERNATE	MFR	MANUFACTURER
APPROX	APPROXIMATE	MH	MANHOLE
ASPH	ASPHALT	MIN	MINIMUM
BL	BASELINE	MISC	MISCELLANEOUS
BLDG	BUILDING	N	NORTH
BM	BENCHMARK	NIC	NOT IN CONTRACT
BOT	BOTTOM	NTS	NOT TO SCALE
BPV	BACK PRESSURE VALVE	O/S	OFFSET
CB	CATCH BASIN	OAR	OWNER'S AUTHORIZED REPRESENTATIVE
CF	CUBIC FOOT OR CUBIC FEET	PL	PROPERTY LINE
CFM	CUBIC FEET PER MINUTE	PE	PERMANENT EASEMENT
CI	CURB INLET	PERP	PERPENDICULAR
CIP	CAST IRON PIPE	PP	POWER POLE, POWER PANEL
CL	CLASS OR CENTERLINE	PPM	PARTS PER MILLION
CO	CLEANOUT	PRV	PRESSURE RELEASE VALVE
CONC	CONCRETE	PSF	POUNDS PER SQUARE FOOT
CR	COUNTRY ROAD	PSI	POUNDS PER SQUARE INCH
CTR	CENTER	PT	PRESSURE TRANSDUCER
CV	CHECK VALVE	PVC	POLYVINYL CHLORIDE
CY	CUBIC YARD	PWR	POWER
DCV	DOUBLE CHECK VALVE	R	RADIUS
DI	DROP INLET	RAD	RADIAL
DIA	DIAMETER	RCP	REINFORCED CONCRETE PIPE
DIP	DUCTILE IRON PIPE	REINF	REINFORCING
DWG	DRAWING	REQD	REQUIRED
E	EAST	ROW	RIGHT-OF-WAY
EA	EACH	RPM	REVOLUTIONS PER MINUTE
EJ	EXPANSION JOINT	RT	RIGHT
ELEC	ELECTRIC	RW	RETAINING WALL
ELEV	ELEVATION	S	SOUTH
EOP	EDGE OF PAVEMENT	SCH	SCHEDULE
FM	FLOW METER	SF	SQUARE FOOT OR SQUARE FEET
FT	FOOT OR FEET	SHT	SHEET
GAL	GALLON	SMH	SANITARY MANHOLE
GPM	GALLONS PER MINUTE	SPECS	SPECIFICATIONS
GRD	GROUND OR GRADE	SQ	SQUARE
GV	GATE VALVE	STA	STATION OR STATIONARY
HDD	HORIZONTAL DIRECTIONAL DRILL	STMH	STORM MANHOLE
HORIZ	HORIZONTAL	SY	SQUARE YARD
HP	HIGH POINT OR HORSE POWER	TC	TOP OF CURB
HR	HAND RAIL OR HOUR	TE	TEMPORARY EASEMENT
HT	HEIGHT	TEL	TELEPHONE
HW	HEADWALL	TEMP	TEMPORARY
HWL	HIGH WATER LEVEL	TF	TOP OF FRAME
HYD	HYDRANT	TYP	TYPICAL
IN	INCH(ES)	U(ND)G	UNDERGROUND
JB	JUNCTION BOX	UTIL	UTILITY
LAT	LATITUDE	VERT	VERTICAL
LB	POUND	VOL	VOLUME
LF	LINEAR FOOT OR LINEAR FEET	W	WEST
LONG	LONGITUDE	W/	WITH
LP	LAMP POST, LIGHT POLE, LIGHT PANEL OR LOW POINT	W/O	WITHOUT

NOTE: SOME ABBREVIATIONS MAY NOT HAVE BEEN USED

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STATE OF NEW YORK · ERIC T. HIRSCHMAN · LICENSED PROFESSIONAL ENGINEER · 101039

CONTRACT: CONSTRUCTION

TITLE: INSTALL WATER TANK

LOCATION: TOWN OF WALLKILL REST AREA MIDDLETOWN, NY

CLIENT: NYS DEPT. OF TRANSPORTATION

MARK	DATE	DESCRIPTION
1	11/06/2020	DOH REVISIONS
	9/11/2020	BID DOCUMENTS

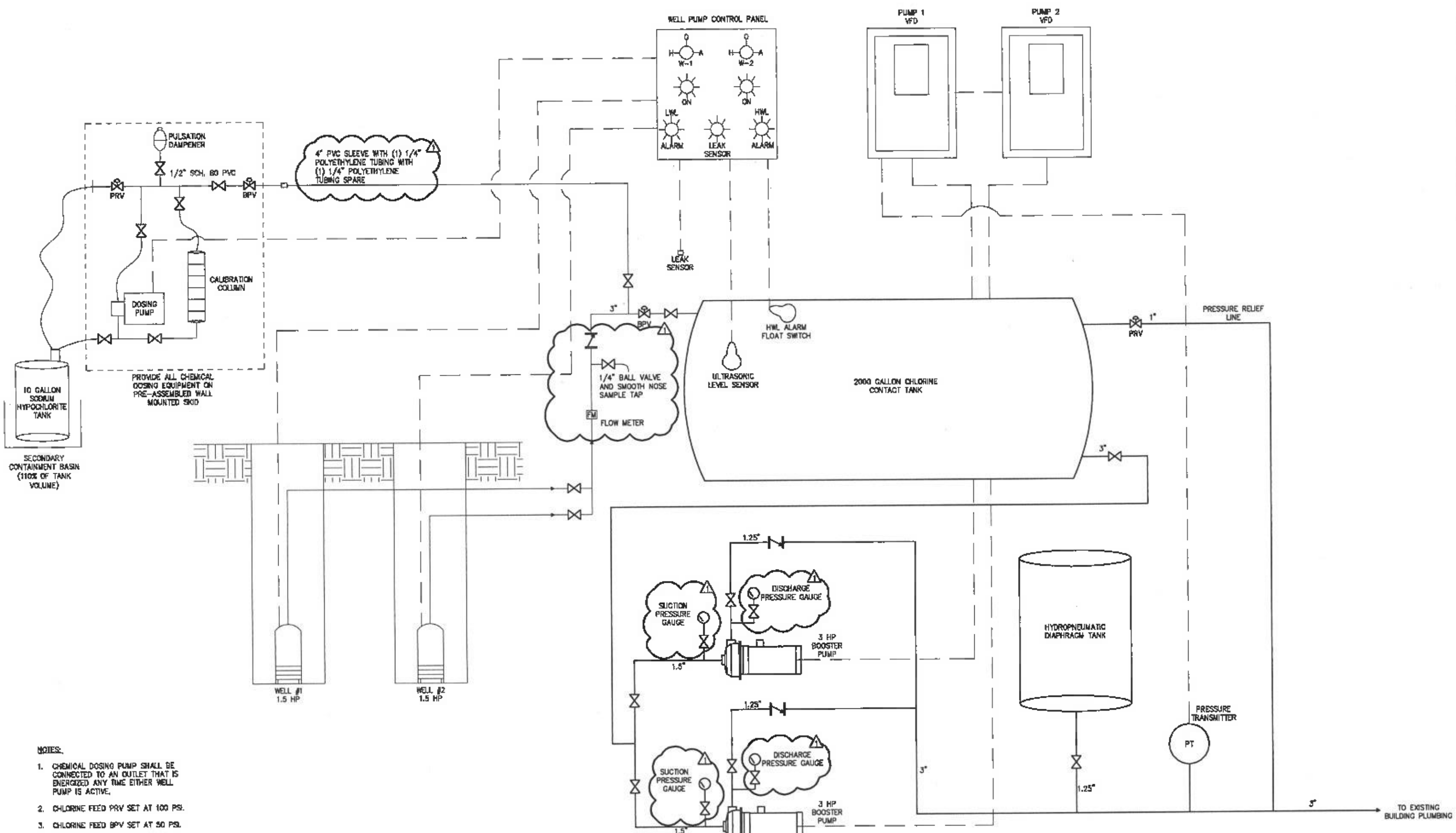
PROJECT NUMBER: J1405
DESIGNED BY: ETH
DRAWN BY: KSM
FIELD CHECK:
APPROVED:
SCALE:

SHEET TITLE: LEGEND & GENERAL NOTES

DRAWING NUMBER: G-002

SHEET 2 OF 20

36x24 PLOT SHEET


WELL PUMP CONTROL PANEL
W-1
W-2
ON
ON
LWL ALARM
LEAK SENSOR
HWL ALARM
PUMP 1 VFD
PUMP 2 VFD
PULSATION DAMPENER
1/2" SCH. 80 PVC
PRV
BPV
4" PVC SLEEVE WITH (1) 1/4" POLYETHYLENE TUBING WITH (1) 1/4" POLYETHYLENE TUBING SPARE
CALIBRATION COLUMN
DOSING PUMP
LEAK SENSOR
PROVIDE ALL CHEMICAL DOSING EQUIPMENT ON PRE-ASSEMBLED WALL MOUNTED SKID
10 GALLON SODIUM HYPOCHLORITE TANK
SECONDARY CONTAINMENT BASIN (110% OF TANK VOLUME)
3"
BPV
1/4" BALL VALVE AND SMOOTH NOSE SAMPLE TAP
FM
FLOW METER
HWL ALARM FLOAT SWITCH
ULTRASONIC LEVEL SENSOR
2000 GALLON CHLORINE CONTACT TANK
1"
PRV
PRESSURE RELIEF LINE
3"
WELL #1 1.5 HP
WELL #2 1.5 HP
1.25"
SUCTION PRESSURE GAUGE
DISCHARGE PRESSURE GAUGE
3 HP BOOSTER PUMP
1.5"
HYDROPNEUMATIC DIAPHRAGM TANK
PRESSURE TRANSMITTER
PT
3"
1.25"
3"
TO EXISTING BUILDING PLUMBING

NOTES:

1. CHEMICAL DOSING PUMP SHALL BE CONNECTED TO AN OUTLET THAT IS ENERGIZED ANY TIME EITHER WELL PUMP IS ACTIVE.
2. CHLORINE FEED PRV SET AT 100 PSI.
3. CHLORINE FEED BPV SET AT 50 PSI.

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CONSULTANT:

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III Winners Circle, PO Box 5269, Albany, NY 12205-0269

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STATE OF NEW YORK · LICENSED PROFESSIONAL ENGINEER · 101035

CONTRACT: CONSTRUCTION

TITLE: INSTALL WATER TANK

LOCATION: TOWN OF WALLKILL REST AREA MIDDLETOWN, NY

CLIENT: NYS DEPT. OF TRANSPORTATION

MARK	DATE	DESCRIPTION
1	11/05/2020	DOH REVISIONS
	9/11/2020	BID DOCUMENTS

PROJECT NUMBER: J1405
DESIGNED BY: ETH
DRAWN BY: KSM
FIELD CHECK:
APPROVED:
SCALE: NOT TO SCALE
SHEET TITLE: PROCESS & INSTRUMENTATION DIAGRAM
DRAWING NUMBER: C-101
SHEET 3 of 20

36x24 PLOT SHEET

Nov 02,2020 – 5:09pm
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N
CONNECT TO EXISTING 1.5" WATER MAIN FROM WELL #2 AND INSTALL NEW 1.5" HDPE TO BUILDING
CUT AND CAP EXISTING 1.5" WELL #1 DISCHARGE PIPE
NEW 1.5" HDPE WATER MAIN. MAINTAIN 18" VERTICAL SEPARATION TO SANITARY LINES
10.0' MIN.
EXISTING SANITARY MANHOLE. CONFIRM LOCATION WITH TEST PIT OR SUBSURFACE UTILITY LOCATING METHODS AS NECESSARY TO AVOID DAMAGE DURING CONSTRUCTION
1.5" HDPE SWEEP RADIUS OR 90° BEND AS NECESSARY
10.0' MIN.
TREATED WATER LINE TO EXISTING PLUMBING
SLOPE ASPHALT DOOR LANDING TO 1" BELOW FINISHED FLOOR. LANDING APPROX DIMENSIONS 6.5'x5'. FEATHER SIDE SLOPES TO MATCH EXISTING GRADE
SLOPE
(2) 1/4" POLYETHYLENE TUBING LINES IN 4" PVC SLEEVE
NEW 1.5" TEE, (3) 1.5" BALL CURB VALVES WITH VALVE BOXES, AND 1.5" X 3" REDUCER. PROVIDE ADAPTERS AS NEEDED TO CONNECT TO EXISTING WELL DISCHARGE PIPES
EXISTING REST AREA FACILITY
CONNECT TO EXISTING 1.5" DISCHARGE PIPE FROM WELL #1
SLOPE
10.0' MIN.
INSULATED PIPING ENCLOSURE
3" HDPE WELL HEADER PIPE BENEATH FOUNDATION AND THROUGH BUILDING ADDITION SLAB. SEE DETAIL 4 SHEET C-601
BUILDING ADDITION FOR WATER SYSTEM EQUIPMENT
3' GRAVEL DRIP EDGE. SEE DETAIL 1 SHEET C-601. PROVIDE DRAINAGE AWAY FROM BUILDING ADDITION

NOTES:

1. THE ORIGINAL BURIED 15,000 GALLON HYDROPNEUMATIC TANK HAS ALREADY BEEN REMOVED, DISPOSED, AND BACKFILLED. RESEED AND RESTORE CONCRETE PICNIC PATIO SLAB AND RESET PICNIC TABLE IN FORMER TANK LOCATION.
2. HDPE PIPE TO BE DR-9 RATED FOR 200 PSI. PROVIDE TRACER WIRE AND LOCATING TAPE ALONG WITH HDPE PIPE. PROVIDE A MINIMUM OF 5' COVER FOR ALL BURIED WATER PIPE.
3. BALL CURB VALVES TO BE BRASS COMPRESSION STYLE BY MUELLER OR APPROVED EQUAL.
4. TRENCHED PIPE TO BE INSTALLED USING SUITABLE BEDDING AND BACKFILL. SEE DETAIL 3 SHEET C-601.
5. REPAIR APPROXIMATELY 50 SF OF SIDEWALK AFTER PIPE INSTALLATION.

0 10 20
Scale in feet

36x24 PLOT SHEET

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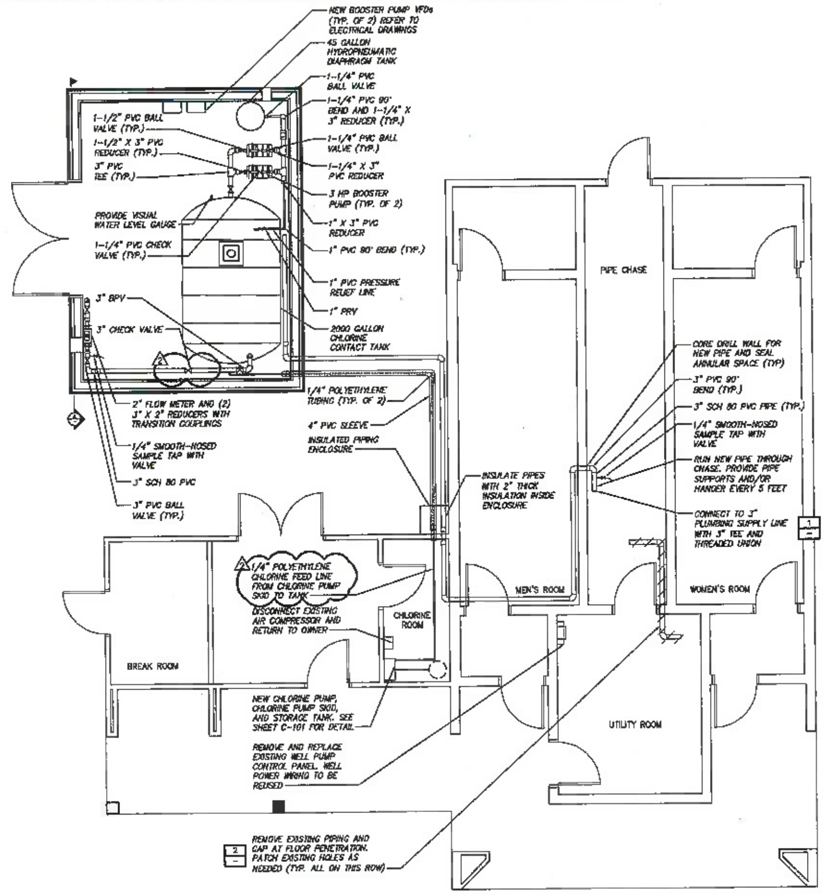
STATE OF NEW YORK · ERIC T. HIRSCHMANN · 101039 · LICENSED PROFESSIONAL ENGINEER

CONTRACT: CONSTRUCTION
TITLE: INSTALL WATER TANK
LOCATION: TOWN OF WALLKILL REST AREA MIDDLETOWN, NY
CLIENT: NYS DEPT. OF TRANSPORTATION

MARK	DATE	DESCRIPTION
1	11/05/2020	DOH REVISIONS
	9/11/2020	BID DOCUMENTS

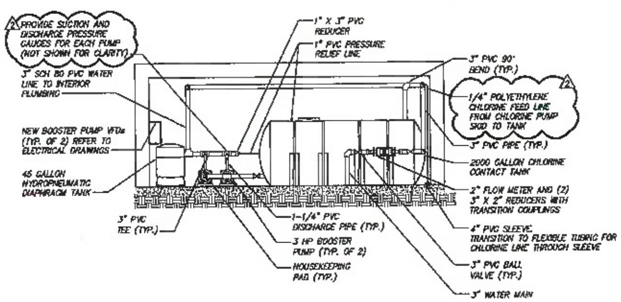
PROJECT NUMBER:	J1405
DESIGNED BY:	ETH
DRAWN BY:	KSM
FIELD CHECK:	
APPROVED:	
SCALE:	1" = 10'
SHEET TITLE:	SITE PLAN
DRAWING NUMBER:	C-102
SHEET	4 of 20


NEW BOOSTER PUMP VFDs (TYP. OF 2) REFER TO ELECTRICAL DRAWINGS
45 GALLON HYDROPNEUMATIC DIAPHRAGM TANK
1-1/4" PVC BALL VALVE
1-1/4" PVC 90° BEND AND 1-1/4" X 3" REDUCER (TYP.)
1-1/4" PVC BALL VALVE (TYP.)
1-1/4" X 3" PVC REDUCER
3 HP BOOSTER PUMP (TYP. OF 2)
1" X 3" PVC REDUCER
1" PVC 90° BEND (TYP.)
1" PVC PRESSURE RELIEF LINE
1" PRV
2000 GALLON CHLORINE CONTACT TANK
1-1/2" PVC BALL VALVE (TYP.)
1-1/2" X 3" PVC REDUCER (TYP.)
3" PVC TEE (TYP.)
PROVIDE VISUAL WATER LEVEL GAUGE
1-1/4" PVC CHECK VALVE (TYP.)
3" BPV
3" CHECK VALVE
2" FLOW METER AND (2) 3" X 2" REDUCERS WITH TRANSITION COUPLINGS
1/4" SMOOTH-NOSED SAMPLE TAP WITH VALVE
3" SCH 80 PVC
3" PVC BALL VALVE (TYP.)
1/4" POLYETHYLENE TUBING (TYP. OF 2)
4" PVC SLEEVE
INSULATED PIPING ENCLOSURE
INSULATE PIPES WITH 2" THICK INSULATION INSIDE ENCLOSURE
PIPE CHASE
CORE DRILL WALL FOR NEW PIPE AND SEAL ANNULAR SPACE (TYP)
3" PVC 90° BEND (TYP.)
3" SCH 80 PVC PIPE (TYP.)
1/4" SMOOTH-NOSED SAMPLE TAP WITH VALVE
RUN NEW PIPE THROUGH CHASE. PROVIDE PIPE SUPPORTS AND/OR HANGER EVERY 5 FEET
CONNECT TO 3" PLUMBING SUPPLY LINE WITH 3" TEE AND THREADED UNION
1/4" POLYETHYLENE CHLORINE FEED LINE FROM CHLORINE PUMP SKID TO TANK
DISCONNECT EXISTING AIR COMPRESSOR AND RETURN TO OWNER
CHLORINE ROOM
MEN'S ROOM
WOMEN'S ROOM
BREAK ROOM
UTILITY ROOM
NEW CHLORINE PUMP, CHLORINE PUMP SKID, AND STORAGE TANK. SEE SHEET C-101 FOR DETAIL
REMOVE AND REPLACE EXISTING WELL PUMP CONTROL PANEL. WELL POWER WIRING TO BE REUSED
REMOVE EXISTING PIPING AND CAP AT FLOOR PENETRATION. PATCH EXISTING HOLES AS NEEDED (TYP. ALL ON THIS ROW)

WATER SYSTEM PLAN
SCALE: 3" = 1'-0"

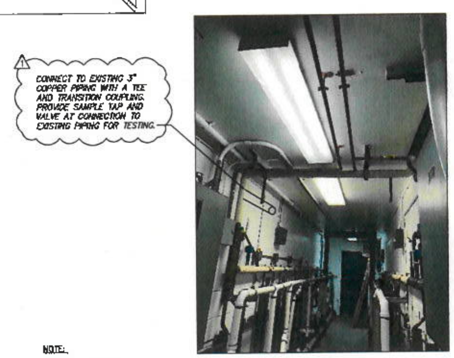
NOTES:

1. EXISTING CONTROL WIRING FOR CHLORINE PUMP TO BE RE-USED, BUT RECEPTACLE ADJACENT TO CHLORINE PUMP TO BE REPLACED.
2. CHLORINE PUMP TO BE MODEL PULSATRON MP SERIES BY PULSAFEEDER, OR APPROVED EQUAL, RATED FOR 0.020 GALLONS PER HOUR. ADJUST TO PROVIDE 1.0 PPM CHLORINE DOSE IN THE CHLORINE CONTACT TANK. CHLORINE PUMP TO BE MOUNTED ON A PRE-FABRICATED SKID, COMPLETE WITH ISOLATION VALVES, PRESSURE RELIEF VALVE, BACKPRESSURE / ANTI-SIPHON VALVE, CALIBRATION COLUMN, AND PULSATION DAMPENER. CHLORINE FEED EQUIPMENT TO BE BY GRIFFCO OR APPROVED EQUAL. 10 GALLON CHLORINE STORAGE TANK SHALL BE BY LMI OR APPROVED EQUAL. INCLUDE SECONDARY CONTAINMENT BASIN CAPABLE OF STORING 110% OF THE TANK CAPACITY.
3. BOOSTER PUMPS TO BE AQUAVAR 3AVN310HM03 BY GOULDS, OR APPROVED EQUAL, RATED FOR 25 GPM AT 156 FEET. BOOSTER PUMP VFDs SHALL BE WIRED TOGETHER SO THE PUMPS RUN IN A LEAD-LAG ARRANGEMENT. PROVIDE NEW PRESSURE TRANSMITTER TO MONITOR THE DISCHARGE PRESSURE IN THE BUILDING PLUMBING PIPING. THE LEAD PUMP SPEED SHALL BE ADJUSTED AUTOMATICALLY BASED ON THE READING FROM THE DISCHARGE PRESSURE TRANSMITTER TO MAINTAIN 50 PSI, WITH A MINIMUM PRESSURE OF 35 PSI AND A MAXIMUM PSI OF 65 PSI (ALL ADJUSTABLE). THE MINIMUM PUMP SPEED SHALL BE 50 Hz (ADJUSTABLE), AND THE VFD SHALL AUTOMATICALLY SWITCH OFF THE PUMP AFTER OPERATING AT THE MINIMUM PUMP SPEED FOR 2 MINUTES OR IF THE MAXIMUM PRESSURE SETPOINT IS REACHED, WHICHEVER COMES FIRST. THE MAXIMUM PUMP SPEED SHALL BE 60 Hz. IF THE LEAD PUMP IS OPERATING AT 60 Hz AND IS UNABLE TO MAINTAIN THE MINIMUM PRESSURE, THE LAG PUMP SHALL BE STARTED AND THE TWO PUMPS WILL OPERATE AT SYNCHRONIZED SPEEDS TO MAINTAIN THE SET POINT. THE VFDs SHALL AUTOMATICALLY ALTERNATE THE LEAD PUMP STATUS AFTER EACH PUMP CYCLE.
4. HYDROPNEUMATIC TANK TO BE BLADDER STYLE, MODEL #V140 BY GOULDS. PRE CHARGE PRESSURE TO BE 38 PSI.
5. CHLORINE CONTACT TANK TO BE FREESTANDING POLYETHYLENE CONSTRUCTION WITH INTEGRATED LEGS, 2000 GALLONS NOMINAL STORAGE, AND TO BE FITTED WITH PORTS OF THE SIZE AND PLACEMENT SHOWN. TANK TO BE BY SNYDER INDUSTRIES OR APPROVED EQUAL.
6. 3-INCH BACKPRESSURE VALVE TO SUSTAIN 60 PSI UPSTREAM PRESSURE AND BE MODEL 23RWR BY ROSS VALVE OR APPROVED EQUAL.
7. 1-INCH PRESSURE RELIEF VALVE TO BE SET AT 60 PSI (ADJUSTABLE) AND BE MODEL 20 WR BY ROSS VALVE OR APPROVED EQUAL.
8. PROVIDE ULTRASONIC LEVEL SENSOR AND HIGH WATER LEVEL FLOAT SWITCH INSIDE CHLORINE CONTACT TANK AND WIRE BACK TO NEW WELL CONTROL PUMP PANEL. INCLUDE MOUNTING HARDWARE AS NECESSARY. LEVEL INSTRUMENTATION SHALL BE BY FLOWLINE OR APPROVED EQUAL.
9. WELL PUMP CONTROL PANEL SHALL START THE LEAD WELL PUMP WHEN THE WATER LEVEL IN THE TANK IS 12 INCHES FROM THE TOP OF THE TANK OR BELOW, AND STOP THE PUMP WHEN IT IS 6 INCHES FROM THE TOP OF THE TANK. THE HIGH WATER LEVEL FLOAT SWITCH SHALL BE MOUNTED 4 INCHES FROM THE TOP OF THE TANK. WHEN THE HWL FLOAT SWITCH IS TRIPPED THE WELL PUMPS SHALL BE STOPPED AND THE HWL ALARM ACTIVATED. WHEN THE WATER LEVEL IS BELOW 24 INCHES, THE PANEL WILL SIGNAL A LOW WATER LEVEL ALARM AND LOCK OUT OPERATION OF THE BOOSTER PUMPS. THE WELL PUMP CONTROL PANEL SHALL AUTOMATICALLY ALTERNATE OPERATION OF THE WELL PUMPS AFTER EACH CYCLE. THE CONTROL PANEL SHALL ENERGIZE THE CHLORINE PUMP OUTLET ANY TIME EITHER WELL IS ACTIVE SO THE CHLORINE PUMP OPERATION WILL BE SYNCHRONIZED WITH THE WELLS.
10. ALL INTERIOR WATER PIPING TO BE SCHEDULE 80 PVC OR APPROVED EQUAL. CHLORINE PIPING TO BE SCH 80 PVC EXCEPT WITHIN PIPE SLEEVE (TRANSITION TO FLEXIBLE ¼" POLYETHLYENE TUBING. PROVIDE PIPE SUPPORTS FOR WATER AND CHLORINE PIPING, AT A MINIMUM EVERY FIVE FEET, AT CHANGES IN DIRECTION, OR TO SUPPORT HEAVIER ITEMS SUCH AS VALVES AND WATER METERS.
11. WATER METER TO BE 2-INCH E-SERIES ULTRASONIC FLOW METER BY BADGER OR APPROVED EQUAL. PROVIDE REDUCERS AND TRANSITION COUPLINGS AS NEEDED TO MAKE CONNECTION.
12. DISINFECT AND TEST ALL PIPING ACCORDING TO THE LATEST EDITION OF AWWA C-653. BEFORE PIPING CAN BE PLACED INTO SERVICE, CONTRACTOR SHALL OBTAIN A MINIMUM OF TWO (2) WATER SAMPLES, COLLECTED 24 HOURS APART, FROM THE ENTRY POINT TO THE BUILDING PLUMBING. THE SAMPLES SHALL BE TESTED FOR TOTAL COLIFORM BACTERIA. TESTING FOR VOLATILE ORGANIC CONTAMINANTS (VOCs) WILL ALSO BE REQUIRED IF SOLVENT WELDED PVC PIPING IS USED.
13. WETTED SURFACES OF ALL PIPING, VALVES, EQUIPMENT, AND APPURTENANCES SHALL BE CERTIFIED LEAD FREE AND CONSTRUCTED OF MATERIALS THAT ARE NSF61 APPROVED FOR DRINKING WATER.
14. SLOPE FLOOR SLAB TOWARDS FLOOR DRAIN. REFER TO STRUCTURAL DRAWINGS.

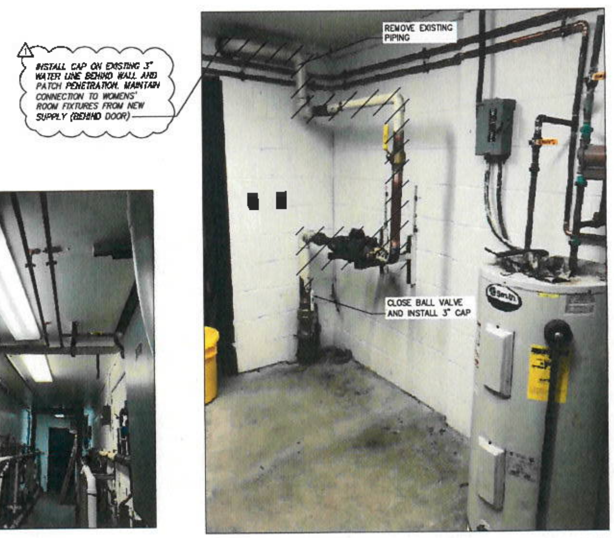

PROVIDE SUCTION AND DISCHARGE PRESSURE GAUGES FOR EACH PUMP (NOT SHOWN FOR CLARITY)
3" SCH 80 PVC WATER LINE TO INTERIOR PLUMBING
NEW BOOSTER PUMP VFDs (TYP. OF 2) REFER TO ELECTRICAL DRAWINGS
45 GALLON HYDROPNEUMATIC DIAPHRAGM TANK
3" PVC TEE (TYP.)
1" X 3" PVC REDUCER
1" PVC PRESSURE RELIEF LINE
3" PVC 90° BEND (TYP.)
1/4" POLYETHYLENE CHLORINE FEED LINE FROM CHLORINE PUMP SKID TO TANK
3" PVC PIPE (TYP.)
2000 GALLON CHLORINE CONTACT TANK
2" FLOW METER AND (2) 3" X 2" REDUCERS WITH TRANSITION COUPLINGS
4" PVC SLEEVE. TRANSITION TO FLEXIBLE TUBING FOR CHLORINE LINE THROUGH SLEEVE
3" PVC BALL VALVE (TYP.)
3" WATER MAIN
1-1/4" PVC DISCHARGE PIPE (TYP.)
3 HP BOOSTER PUMP (TYP. OF 2)
HOUSEKEEPING PAD (TYP.)

A **SECTION "A"**
SCALE: 3" = 1'-0"

NOTE:
1. VERIFY ALL PIPE SIZES PRIOR TO ORDERING MATERIALS



1 **PIPE CHASE PIPING CONNECTION**
SCALE: N.T.S.



2 **EXISTING WATER SERVICE ABANDONMENT & REMOVAL**
SCALE: N.T.S.

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TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THE DRAWINGS BEARING MY PROFESSIONAL SEAL AND SIGNATURE MEET OR EXCEED THE NEW YORK STATE ENERGY CONSERVATION CODE IECC 2015 WITH 2016 NYS AMENDMENTS.

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STATE OF NEW YORK · ERIC T. HIRSCHMANN · LICENSED PROFESSIONAL ENGINEER · 101039

CONTRACT: CONSTRUCTION
TITLE: INSTALL WATER TANK
LOCATION: TOWN OF WALLKILL REST AREA MIDDLETOWN, NY
CLIENT: NYS DEPT. OF TRANSPORTATION

MARK	DATE	DESCRIPTION
2	11/03/2020	DOH REVISIONS
1	8/24/2020	WATER REVISIONS
	6/11/2020	BID DOCUMENTS

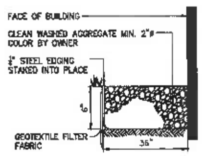
PROJECT NUMBER:	J1405
DESIGNED BY:	ETH
DRAWN BY:	KSM
FIELD CHECK:	
APPROVED:	
SCALE:	3" = 1'-0"

SHEET TITLE: BUILDING PIPING PLAN

DRAWING NUMBER: **C-103**

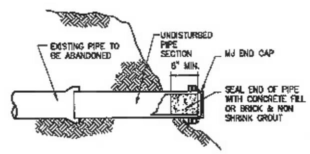
SHEET 5 OF 20

36x24 PLOT SHEET

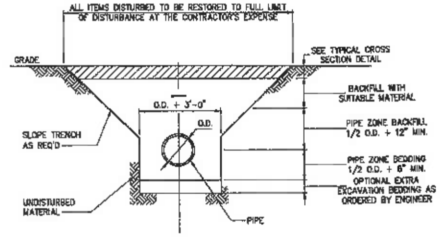


1 DRIP EDGE DETAIL
SCALE: N.T.S.

NOTE:
1. THIS DETAIL IS NOT SUBJECT TO THE REVIEW AND APPROVAL OF THE OCDOH.

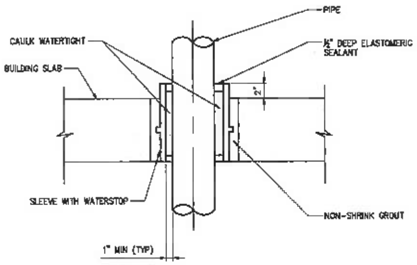


2 PIPE CAPPING AND ABANDONMENT DETAIL
SCALE: N.T.S.

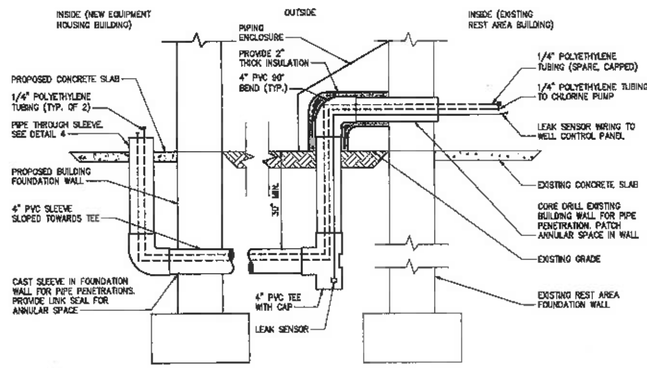

ALL ITEMS DISTURBED TO BE RESTORED TO FULL LIMIT OF DISTURBANCE AT THE CONTRACTOR'S EXPENSE
GRADE
SEE TYPICAL CROSS SECTION DETAIL
O.D. + 3'-0"
O.D.
BACKFILL WITH SUITABLE MATERIAL
PIPE ZONE BACKFILL 1/2 O.D. + 12" MIN.
SLOPE TRENCH AS REQ'D
PIPE ZONE BEDDING 1/2 O.D. + 6" MIN.
OPTIONAL EXTRA EXCAVATION BEDDING AS ORDERED BY ENGINEER
UNDISTURBED MATERIAL
PIPE

NOTES:
1. PIPE ZONE BEDDING AND BACKFILL MATERIAL TO BE 3/4" CRUSHED STONE OR SAND.
2. NATIVE RUN OF TRENCH MATERIAL MAY BE CONSIDERED SUITABLE MATERIAL IF IT IS FREE OF COBBLES, LARGE ROCKS, AND CLAYS.

3 TYPICAL TRENCH DETAIL
SCALE: N.T.S.

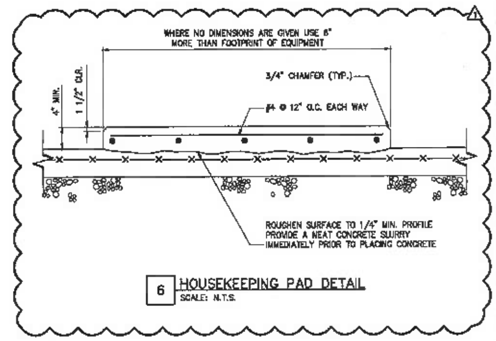


4 TYPICAL SLEEVE IN FLOOR SLAB DETAIL
SCALE: N.T.S.


INSIDE (NEW EQUIPMENT HOUSING BUILDING)
OUTSIDE
INSIDE (EXISTING REST AREA BUILDING)
PIPING ENCLOSURE
PROVIDE 2" THICK INSULATION
4" PVC 90° BEND (TYP.)
PROPOSED CONCRETE SLAB
1/4" POLYETHYLENE TUBING (TYP. OF 2)
PIPE THROUGH SLEEVE. SEE DETAIL 4
PROPOSED BUILDING FOUNDATION WALL
4" PVC SLEEVE SLOPED TOWARDS TEE
30" MIN.
CAST SLEEVE IN FOUNDATION WALL FOR PIPE PENETRATIONS. PROVIDE LINK SEAL FOR ANNULAR SPACE
4" PVC TEE WITH CAP
LEAK SENSOR
1/4" POLYETHYLENE TUBING (SPARE, CAPPED)
1/4" POLYETHYLENE TUBING TO CHLORINE PUMP
LEAK SENSOR WIRING TO WELL CONTROL PANEL
EXISTING CONCRETE SLAB
CORE DRILL EXISTING BUILDING WALL FOR PIPE PENETRATION. PATCH ANNULAR SPACE IN WALL
EXISTING GRADE
EXISTING REST AREA FOUNDATION WALL

5 CHLORINE SLEEVE FLOOR DETAIL
SCALE: N.T.S.

NOTE:
1. LEAK SENSOR SHALL BE SERIES WD3 WATER LEAK DETECTOR BY DWYER INSTRUMENTS OR APPROVED EQUAL



6 HOUSEKEEPING PAD DETAIL
SCALE: N.T.S.

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CONTRACT: CONSTRUCTION
TITLE: INSTALL WATER TANK
LOCATION: TOWN OF WALLKILL REST AREA, MIDDLETOWN, NY
CLIENT: NYS DEPT. OF TRANSPORTATION

MARK	DATE	DESCRIPTION
△	11/05/2020	DOH REVISIONS
	9/11/2020	BID DOCUMENTS

PROJECT NUMBER: J1405
DESIGNED BY: ETH
DRAWN BY: KSM
FIELD CHECK:
APPROVED:
SCALE: AS SHOWN
SHEET TITLE: CIVIL, TANK, & PIPING DETAILS
DRAWING NUMBER: C-601
SHEET 6 OF 20

36x24 PLOT SHEET